

SOFTWARE REVIEWS: OPEN ACCESS PALANTIR REVELATION

AUSTRALIAN

PC WORLD

JULY 1984

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About IBM PCs and compatibles

SHOULD YOU WAIT FOR IBM'S PORTABLE?



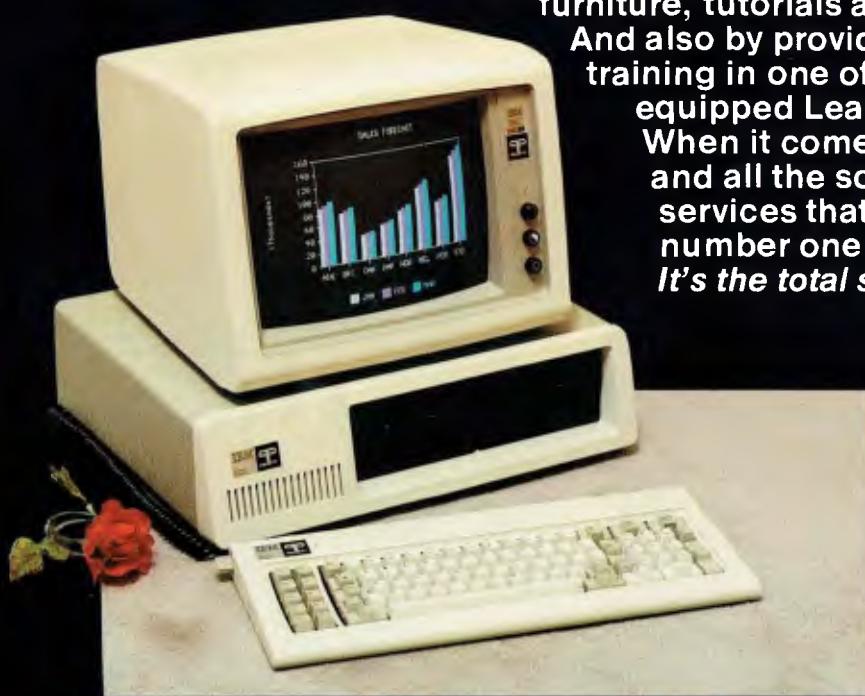
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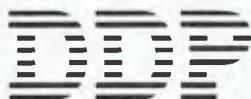
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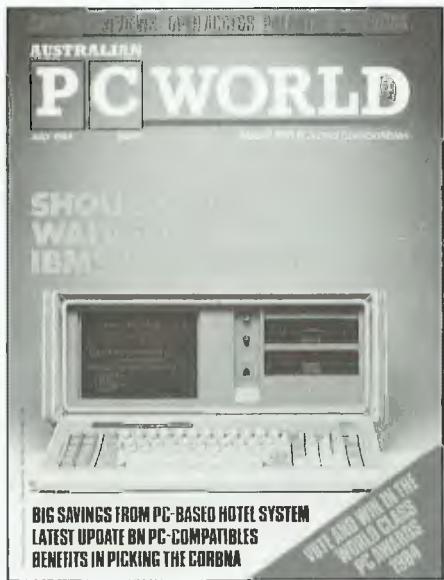
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IBM's long-awaited portable PC has not been released in Australia, but a few machines were imported. Neville Angove reviews one such model and asks whether it is worth waiting for.

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JULY 1984

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PC HOTLINE

First Aussie PCs. In an industry plagued by postponed product releases and broken promises, it is refreshing to hear that the first shipment of Australian-assembled PCs left IBM's Wangaratta plant on June 7, almost a month ahead of schedule. All PCs (and PC XT's) destined for the Australian market will be assembled at Wangaratta, (IBM's third PC plant), with exports to New Zealand and South-East Asia due to begin later this year.

Brian Finn, managing director of IBM Australia, says IBM's sustained growth over recent years had enabled the company to embark on a number of local manufacturing initiatives, of which PC production in Australia was an important one. "We're delighted to be ahead of our original schedule," he said.

The assembly of IBM's range of Selectric typewriters, which began at Wangaratta in 1976, will be phased out by September as full PC production is phased in. All future typewriters will be supplied from overseas. The Australian-assembled PCs will not attract import duties, and IBM has announced that prices will be cut by up to 19 per cent.



PCs start shipping out of Wangaratta ahead of schedule.

HP unveils LaserJet printer. Hewlett-Packard has unveiled a printer that is claimed to combine the speed and flexibility of laser printing with letter-quality printing.

LaserJet, with a speed of eight pages a minute, works about five to 10 times faster than most daisywheel printers, according to Hewlett-Packard. Its noise level is less than 55 decibels. The printer can mix up to four fonts on a page with near-typeset quality. Proportional or nonproportional characters, in italic, bold or underline type, can be selected. A maximum of 176 characters can be printed across an 11in page using an optional compressed font provided by plug-in font cartridges.

LaserJet has a built-in sheet feeder with a capacity of 100 sheets, and can print on letter and legal size paper as well as European A4 and B5 paper. Other sizes and types of paper, such as labels and paper with prepunched binder holes, can be used with the manual feed capability, Hewlett-Packard said.

Other features include RS232 interface, at 9600 bits/sec; a 56K-byte buffer for up to six pages; disposable print cartridge that lasts 300 pages; a mean time between failure of 30,000 pages or 3000 hours; and target usage of 3000 pages a month.

LaserJet also works with the PC and compatibles. Price is \$US3495.

IBM shipping PC-IX. In a move that brings IBM's version of Unix into retail distribution, the company has begun shipping PC-IX to its own Product Centre stores, and has hinted that other retail channels might open up.

IBM has also announced it has set up a special group to obtain languages and applications for PC-IX. The program resembles AT&T's joint effort with Digital Research to form a Unix applications library.

Speaking at a Unix Forum in San Francisco recently this month, PC-IX product manager Bob Blake said IBM has expanded the distribution of PC-IX to include the Product Centres. When the operating system was announced last January, IBM said PC-IX would be available only through its national account sales teams, Blake said.

Blake would not comment when asked if IBM intended to move PC-IX through its network of authorised independent dealers as well.

Realising that the availability of PC-IX applications is a critical issue, IBM has assembled a team in Dallas, Texas, to obtain third-party software for PC-IX that will be remarketed by IBM. Blake said the first programs to be marketed are INfort, a Fortran compiler, and INnet/INmail, a networking/messaging system, both of which were developed by Interactive Systems Inc of California. These programs will be available in July, he said.



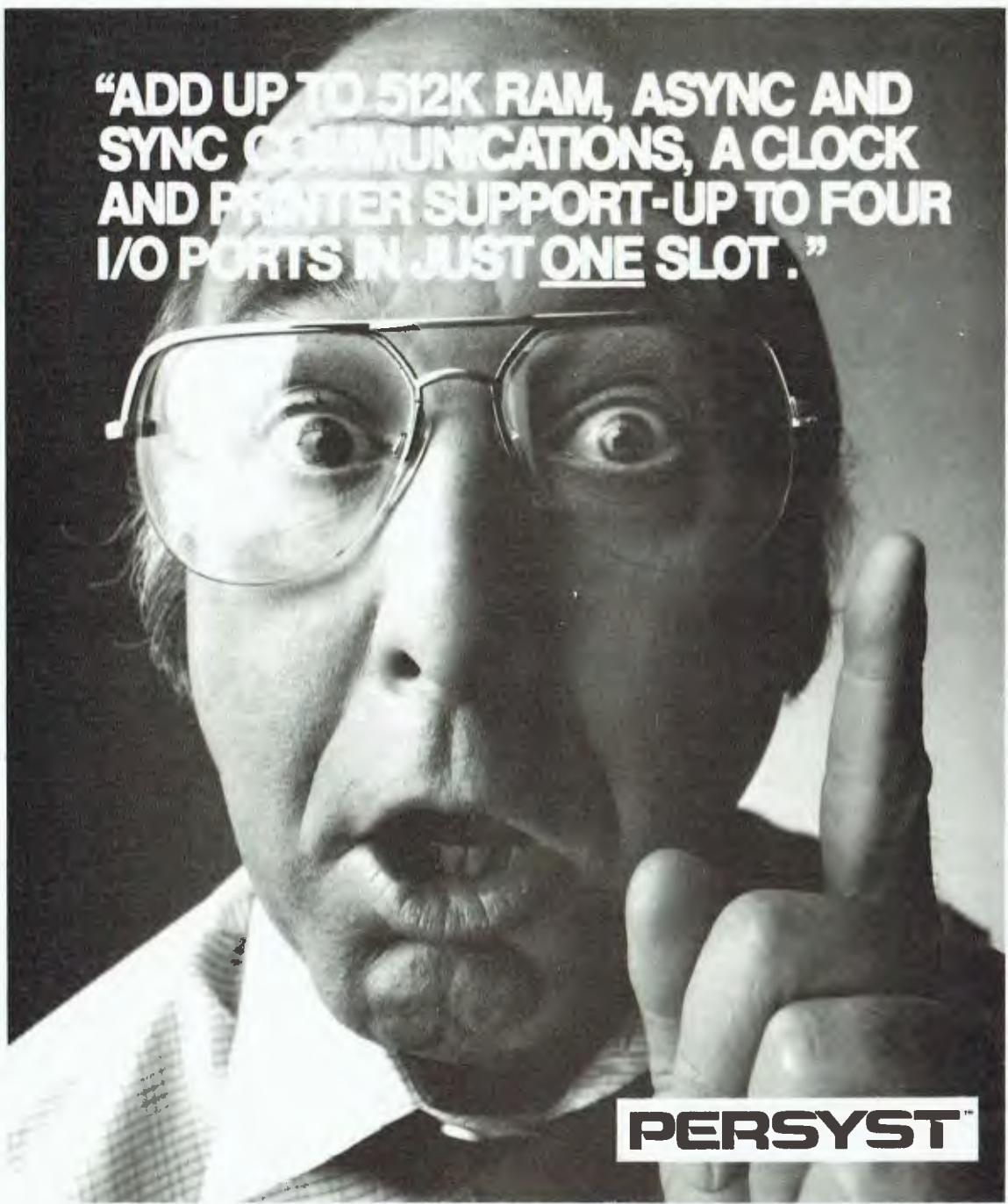
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PC HOTLINE

Digital Research crystalises. Digital Research Inc has unveiled a number of products, including a "Mac-alike" operating system front end, code-named Crystal, that is scheduled to be completed later this year, and its retail-oriented Concurrent PC-DOS, a multi-tasking version of CP/M that also supports DOS applications.

Digital Research officials said they expect Crystal will compete with Microsoft's announced but not-yet-available Windows, a mouse/windows/graphics interface. One difference between the two products, however, will be Crystal's support of all operating systems that Digital Research deems standard, including the company's own CP/M and CP/M derivatives, and PC-DOS, the PC operating system developed by rival Microsoft.

Even Unix is being considered as a target environment for Crystal, said Fred Langhorst, Digital Research's director of corporate planning and development.

Windows, on the other hand, is intended only for Microsoft's operating systems, MS-DOS and Xenix.

According to Langhorst, Crystal is being built upon Digital Research's GSX graphics software and will be capable of supporting bit-mapped graphics, mice, windows, and icons, much like the Macintosh. But Crystal will be more open-ended than the Macintosh, which strictly defines the development environment, Digital Research said.

Perfect solution for Thorn. The British conglomerate Thorn EMI has agreed to market and distribute all products of Perfect Software, the Californian publisher of business-application software. Negotiations between the two companies began last year, and had apparently ended late in the year when Thorn EMI signed a letter of intent to merge with Perfect.

The deal called for Thorn to pay \$US7.7 million in a four-year buy-out arrangement. The merger never occurred, and negotiations continued.

Under the new agreement, Perfect will receive \$US500,000 in advance royalty payments. The agreement also stipulates that Perfect Software's Product Science Centre will develop new products exclusively for Thorn EMI. Marketing will be handled by Thorn EMI Computer Software, a US subsidiary. Thorn EMI says it will market, in the US and abroad, new MS-DOS 2.0 versions of Perfect software in four packages: Perfect Writer 2.0 word processing program combined with Perfect Speller/Theasaurus 2.0; Perfect Calc 2.0 spreadsheet; Perfect Filer 2.0 database; and Perfect Link 2.0 communications program. The programs are available in PC-DOS versions.

Versions for the Apple IIc, IIe, and PCjr will be available in July, according to the company. Thorn EMI says generic versions compatible with MS-DOS, CP/M-86, and CP/M-80 will be enhanced for international use "on a specific country-by-country basis".

Computer Associates buys Sorcim. Sorcim, creator of the SuperCalc line of spreadsheet programs for microcomputers, has been bought out by Computer Associates, a provider of mainframe software.

The New York company agreed to pay \$US17.6 million over the next five years to buy Sorcim, located in California. Additional payments could total up to \$US8.9 million, depending on sales of the Sorcim product line over the next four years.

The Sorcim acquisition is the latest in a series of moves into the microcomputer arena by Computer Associates, one of the largest providers of system and applications software for mainframe computers. Last July, the company acquired Information Unlimited Software, makers of EasyWriter, EasySpeller, and other microcomputer applications. Early this year, Computer Associates unveiled its own CA-Executive software package for the PC and compatibles, which consists of a series of integrated application programs, a window manager, and a micro-to-mainframe communications program.

"This is a clear indication we're in the software business," said Arnold Mazur, vice-president of marketing for Computer Associates. "If someone needs a software package, we intend to be able to provide it."

Dealers expect IBM revamp. Within the next four months, IBM is expected to revamp its product line, with a reconfiguration of the PCjr and the introduction of a new product to replace the PC.

US dealers report that IBM has a new product in the works, designated as PCi, and due for shipment about October.

Meanwhile, after more than four months of stagnant PCjr sales, IBM has notified dealers that they will be credited for all PCjrs bought, including units already sold. Dealers will be rebilled for the PCjrs after 90 days, presumably at a lower price.

The move is seen as the first indication that IBM plans to reconfigure and reposition the uninspiring PCjr. It also marks the first time that IBM has ever helped to float dealer inventories.

Dealers expect IBM to upgrade the PCjr by August 31 with a new keyboard, more memory, and a new advertising program. IBM confirmed its new credit arrangement for the PCjr.

Dealers who recently received fourth-quarter statements from IBM said a new product, designated PCi, is listed on the statements. The statements indicate that dealers will receive the new PCis in place of their PC allocations from October 1.

"There appears to be at least a repackaging, if not a replacement, of the PC," one dealer said. "And if that is the case, then IBM will cut the price on the PC to clear out inventories."

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The PC industry has been expecting a portable from IBM for two years. It was announced earlier this year in the US, and is starting to appear in Australia. Neville Angove asks whether it was worth the wait.

Is IBM's Portable Worth the Wait?

When IBM released the Portable PC in the US early this year, the stocks of several companies took a nosedive. The Compaq PC in particular, combining a high degree of PC-compatibility with transportability, was reduced in price to retain a market share when its main "better than the PC" advantage disappeared.

Several other transportable PC-compatibles, the most notable of which is the Eagle Spirit, appear likely to fall victim to the Portable PC, and some new entries into the fray have been priced well below their equivalent desktop models.

Even in Australia, where we are still waiting on IBM for the release of the Portable PC, the market has been badly unsettled. There has been a rush by some dealers to establish a market presence for competing machines such as the Compaq, Eagle Spirit, Hyperion and TeleVideo TPC-II before the Portable PC arrives. While some IBM distributors are

content to wait on IBM's convenience, others are importing the Portable PC in quantity in order not to lose any market share.

While most users seem content also to wait for IBM and ignore the PC-compatible portables already available, others have brought the Portable PC into the country as hand luggage (surprisingly, Customs has been remarkably liberal about this). A close look at these early arrivals shows that waiting for IBM is an exercise with little hope of a worthwhile return.

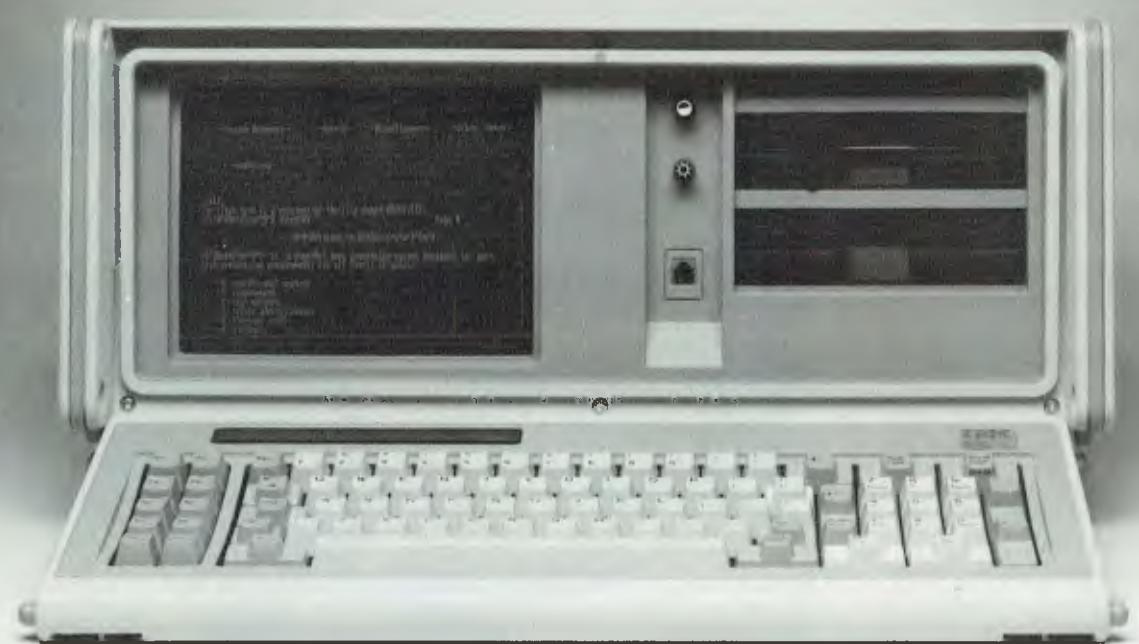
Like all the portable microcomputers using a built-in CRT display, the Portable PC is more of a transportable, being about the same size and weight as the PC system unit but slightly higher at the front to provide room for the display. At 20cm high (at the front, tapering to 15cm at the rear), 50cm wide, 43cm deep, and weighing about 14kg, it is the same general size as most transportables.

The standard PC-style keyboard

which acts as the bottom of the system when it is packed for transport — drops down to reveal a 9in amber monitor on the left, screen controls in the centre, and one or two slimline floppy disk drives on the right. There is a small cavity above the A drive with enough room to store half a dozen disks, a feature not found on some of the competitors.

On the rear of the machine, a nifty bifold panel running the width of the case folds down to show eight expansion slots, the power cord socket and on/off switch, and a voltage selector that allows 110 or 230 volt operation. A large carrying handle completes the picture.

The inside of the Portable is much as you would expect. Underneath the light plastic case are separate RF shields over the motherboard and disk drives, power supply, and video display. Underneath these on the right are the disk drives — Qume models in the review machine — with the motherboard beneath them.



PC PORTABLE

running up against the metal shield that separates the PC electronics from the monitor and power supply.

The motherboard is socketed for 256K-bytes of RAM in four banks, and has eight expansion connectors (only three of which will accept full-length boards). An Intel 8088 processor and a socket for an 8087 coprocessor are located at the far right, near the eight expansion sockets — the last components on the motherboard in that direction.

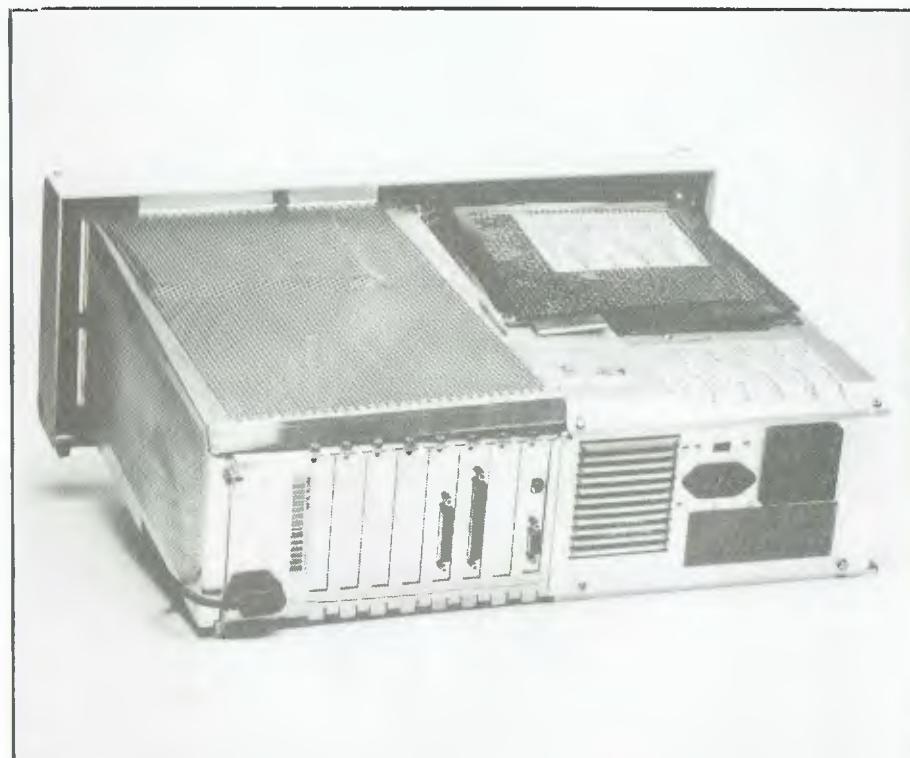
The basic Portable PC is delivered with only a single floppy disk drive, a color/graphics board in slot one, the diskette drive board in slot three, Basic in ROM, and 256K-bytes of RAM. The review machine also had a parallel printer board in slot four. Since the video board and the diskette drive controller board must occupy slots one and three respectively, only slot two is available for full-length PC expansion boards.

There are two interesting changes to the circuitry (apart from the redesign of the motherboard): the color/graphics board and motherboard are manufactured with a copper toning instead of the usual green toning; and the color/graphics board has a direct connection to the monitor instead of having all signals transferred through the expansion bus.

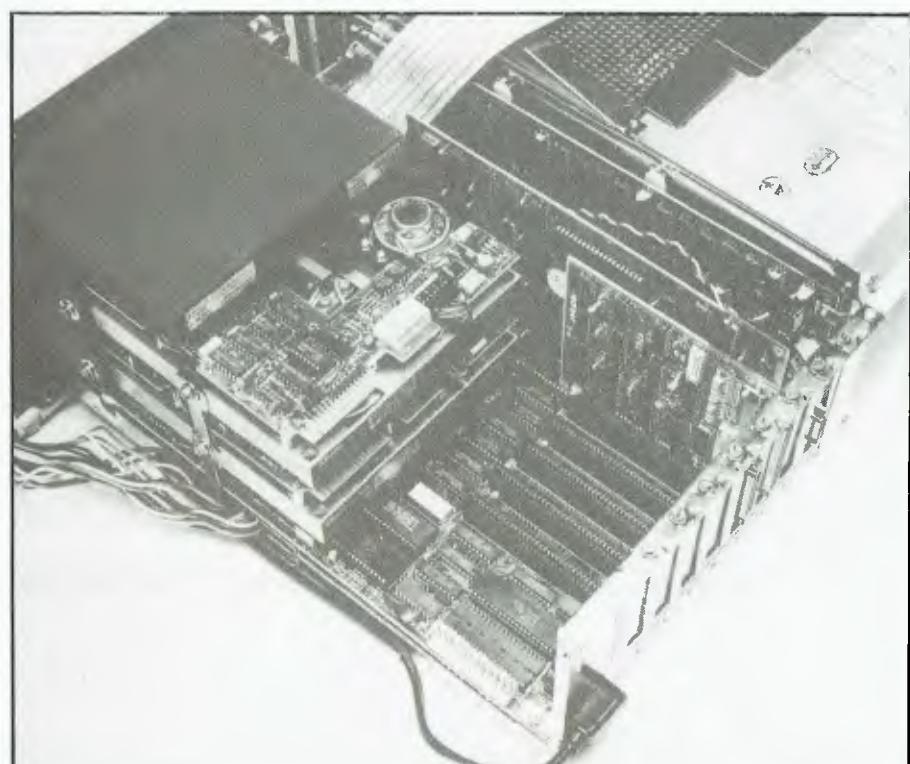
The Portable PC's major surprises are in the Guide to Operations manual. Apart from being more detailed than the PC manual, it contains repeated references to unannounced options, and very firmly locates the Portable PC in IBM's marketing strategy.

One surprise relates to the use of the expansion slots. The manual consistently ignores slot eight; although it shows it on various diagrams (and it is on the motherboard), the manual claims that there are only seven expansion slots. Another surprise is that only slot two can be used for most expansion options, especially those relating to inter-system communication.

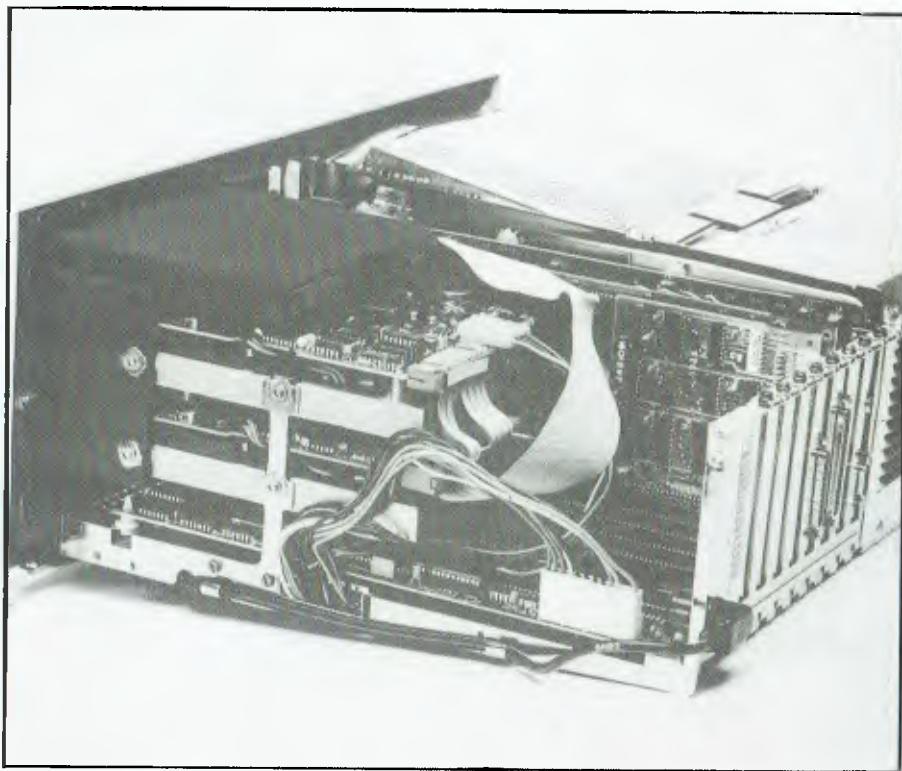
Additional memory boards, the cluster adapter, SDLC controller,



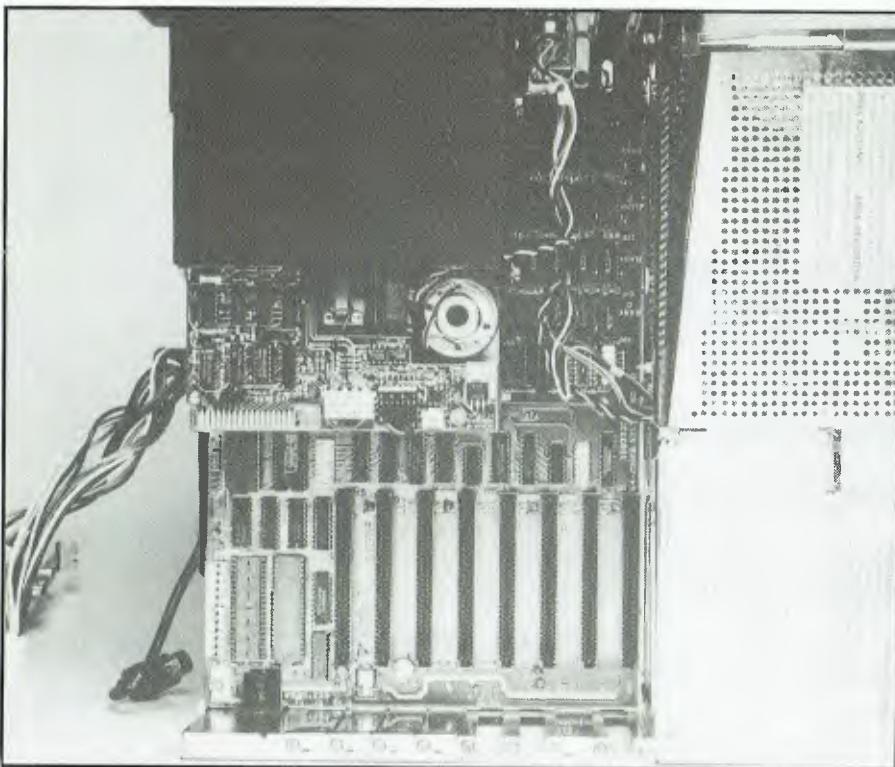
The back of the portable PC with cover removed. RF shield over expansion slots and disk drives on left side and top, and keyboard connector at left rear.



Expansion slots with RF shield removed. Color/graphics display board at top, separated by vacant slot from drive controller in slot 3 and parallel board in slot 4.



Side view with RF shield removed, shows two slimline drives at left, with controller board cabling.



Top view of expansion slots with all cards removed. Intel 8088 processor at bottom left, with socket for 8087 coprocessor adjacent. Yes Virginia, there are 8 expansion slots!

BSC board, extender board and prototyping board can only be used in slot two, and only the first two boards mentioned can be used in the expansion chassis.

Most of the references in the manual to the Portable PC include comments about its connection to a color monitor and expansion chassis, and the diagnostic routines also test for faults in an attached expansion chassis. The impression given is that IBM expects the Portable PC to be used primarily when connected to the expansion system, and does not expect it to be lugged around too often.

The diagnostic routines also refer to a compact dot matrix printer and a wide-carriage dot-matrix color printer, neither of which have been released yet.

An interesting note in the manual mentions that "normal shipping and handling can result in permanent loss of data" from the hard disk in the expansion chassis; this does not bode well for a hard-disk version of the Portable PC.

In operation, the Portable PC provides no surprises. The amber screen is easy to read (easier than the full-size color screen) in spite of having to display text using the poor resolution of the color/graphics board. The absence of a cooling fan makes for quiet operation, but the keyboard is still noisily unchanged.

Overall, the Portable PC provides no advantages over competing portables. In fact, it has some deficits.

Virtually no provision has been made for raising the front of the Portable for easier viewing —there are two very small and very useless legs. The close fit of the color/graphics card, extra memory card, and diskette drive controller card, without a fan for cooling, will cause a worsening of the overheating problems that already plague the PC.

The design of the expansion system, limiting the types of options that can be fitted to the Portable PC by requiring that most fit in slot two only, makes this system less versatile

than the original PC even if an expansion chassis is used.

In spite of the blue carry bag with shoulder strap and IBM logo, the Portable PC is still one hell of a load.

Australian users wondering if the Portable PC is worth waiting for have a choice: if all that is wanted is the

IBM logo, this machine can perform about as well as the desktop system (if you do not mind the effects of several design faults); if what is wanted is just a portable personal computer, the Portable PC offers nothing that cannot be found on competing machines.

PC



Back view of portable, with door over connectors closed and carrying handle in its recess.



Back view with door open showing (left to right), expansion slots and connectors, air vent, power cord socket and voltage selection switch, and on/off switch.

IBM Portable Personal Computer

CPU:

Intel 8088 (4.7MHz).

Memory:

256K RAM; expandable to 640K
40K ROM.

Disk Drives:

One 360K 5 1/4" floppy disk drive;
optional second floppy drive.

Interfaces:

RGB and composite video output;
no communications ports
standard on base model.

Keyboard:

Detached, with 83 keys
(same as PC).

Display:

25 lines by 80 characters
9in amber:
640 x 200 or 320 by 200 or
160 by 200 pixel monochrome
graphics.

Operating System:

PCDOS 2.1, CP/M-86.
Concurrent CP/M-86.

Software:

Any PC software compatible
with the PC that does not require
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Open Access is a true manager's decision support system, integrating all necessary tools in one package — including superb 3D graphics. But Ron Pollak finds it a bit slow on the draw...

OPEN ACCESS: The Integrated Desktop

Open Access is a modular package designed for managers who want to make extensive use of the power of a personal computer. It offers a smorgasbord of features, some of which will be used every month, some daily and some on the hour. Open Access has a calculator (available almost all the time in any of the modules); a spreadsheet (with, if my maths are right, 3000 rows by 216 columns); a graphics feature with 3D graphics (just when I thought I was beginning to understand two dimensions); a database (which borrows some of its commands from dBase II and its query language from IBM's mainframe product SQL); a communications module (one of the more difficult areas to conquer); a time management calendar and diary; a word processor (which I am using to prepare this article).

This review briefly outlines the initial experience we had with the various modules. To do it real justice, we would have to spend a great deal more time with two modules: the spreadsheet and the database.

Open Sesame

Open Access makes extensive use of windows to represent the various command levels. After the user has

entered the date, the system provides a window at the right of the screen. The option menu, as it is called, lists all the modules, offers access to the utilities and, not unpredictably, provides a means of getting back to the operating system.

If you press the Help key (see later) it will create a further window in the bottom half of the screen. Press the Help key again and Open Access introduces another window, in this case on top of (overlying) the option menu. This second help screen lists the

This package will run on a monochrome screen, but it is designed for color.

use of each of the function keys. The Escape key takes the user back to the previous window level.

We can see this window concept in a few products, Visi On for instance, and it is handled reasonably well in Open Access. But here it does not allow the user to have different modules on the

screen at the one time, nor different spreadsheets as does Visi On. In the spreadsheet module, however, it does do more than Lotus or Multiplan do with their windows: the format of the Open Access spreadsheet can be set differently in different windows. For example, one window displays the formulas of the model in the spreadsheet while the other shows the results of the formulas.

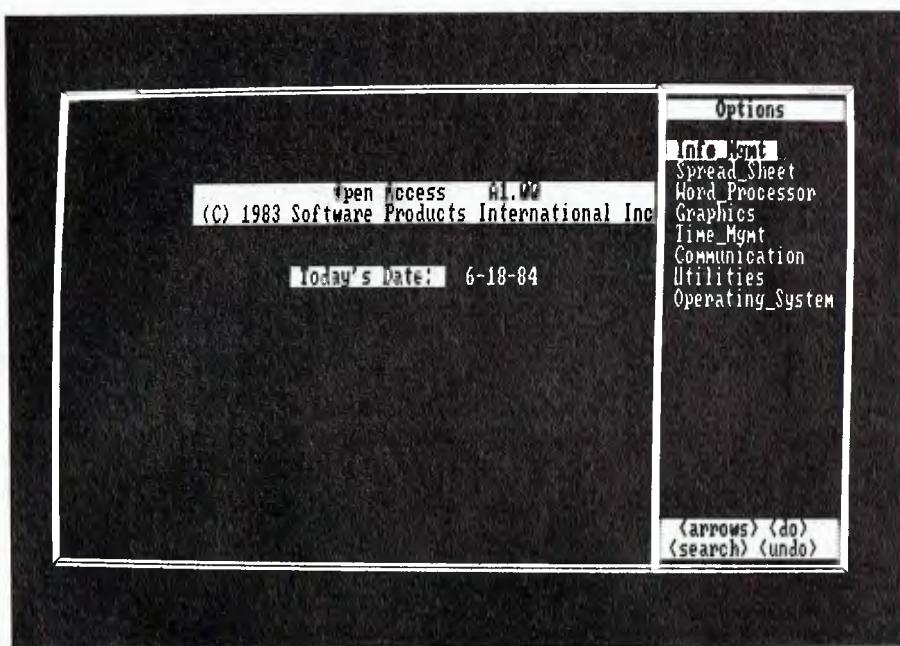
Template

Like the Lotus 1-2-3 template, Open Access' keyboard template fits neatly over the function keys, but literally goes one step further to cover the Esc key. This is renamed Undo, and it returns the user to the main command level within each module (a la Multiplan) rather than just back one step as does Lotus. Either is effective in extricating the user from an incorrect entry.

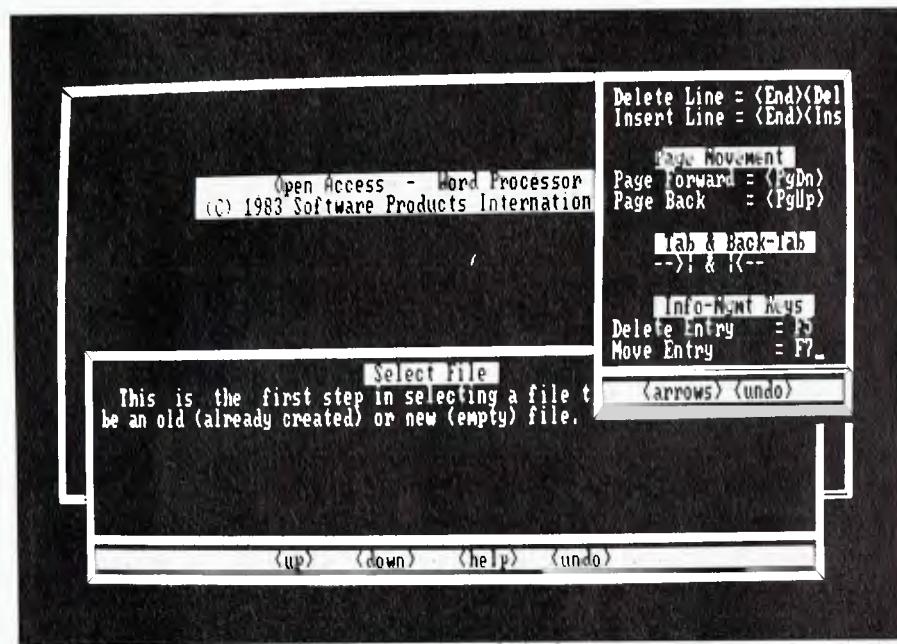
Functions

Most of the 10 function keys operate consistently throughout all modules, but there are four exceptions. Here is what the keys do:
F1 for Help.
F2 for Menu, an interesting alternative

OPEN ACCESS



Open Access main menu screen, with the options listed on the right, and the four commands available to the user in reverse video underneath.



Word processing screen, with no file loaded. The help screen is superimposed, and over this (upper right) is the word processor command list.

to VisCalc or Lotus' slash (/) key and it obviates the need to display the commands throughout processing as Microsoft has done with its Multiplan/Word series.

F3 for Print: setting headings, page numbering and so on for all modules is effected through this function key. If you are happy with the defaults, just hit F3 twice.

F4 for Search: a window is created in the middle of the screen which will list all the relevant files for that particular module. If, for example, you are in Graph, it will list all the graph files. F6 for Change: this allows different types of change, depending on the module. In the word processor, for instance, it allows a change in the format of the text being input from bold to underline to italics.

F8 for Calc (oops, here's an exception): in most modules, the F8 key turns on the calculator — a window at the top right-hand side of the screen that permits those simple functions that one would normally perform with a hand-held calculator. But in word processing, this key is used to speed up formatting.

F10 for Do: this key is sometimes interchangeable with the Return key, sometimes not. It seems to perform the same sort of role as Return and I have not worked out what necessitates a special key. I must admit this is one key that I found difficult to get used to as, in all the other programs that I have come across, the Enter/Do key is the Return key.

Now some people may be thinking that I cannot count. What happened to F5, and F7? The template is blank for these (and for F6) as they also have different roles in the different modules.

Color

Open Access will run on a monochrome screen — and I know a number of people who would never even consider doing word processing on anything but monochrome. But this is a package which has been designed for color.

Take the word processing module.

The screen border showing the tabs and so on is yellow. The menu border has a bright blue background and the text is white. The commands are green against the black background. Text on the screen is the same as the commands (green on black). Should you format text as bold, it is displayed as white, underline is black on green, italics is fire-engine red. Marking text for deletion will cause Open Access to present the portion to be deleted in IBM's magenta.

Perhaps the module that benefits most from color is the graphics module, where a choice of palettes is possible — and almost all the options one could dream up. It really is fantastic! Some combinations can be awful, but this is not the fault of the Software Products International (SPI) people. Perhaps these clever people could come up with some sort of code of aesthetics.

Documentation

The quality of the documentation in the main is excellent. The user manual is snap-ring bound, and intended for teaching the uninitiated the glories of the package. While not a great deal of time has been spent in making the diagrams appear pretty, they are among the clearest I've encountered.

The ring-bound reference manual is not quite as good as the user manual. This is a bit disappointing, as the reference manual will be called upon more frequently than the user manual in days to come. The reference manual offers a brief summary of the purpose of each command; an explanation of its use and an example. Microsoft uses this structure and, generally, its packages (Multiplan for example) are designed for greater user friendliness and less power. Lotus 1-2-3's manual combines the lesson with the reference notes, a process which makes for less swapping between manuals but more time to find the right page (Lotus compensates for this by giving an online page reference in its help screens). Lotus manuals are designed for reference more than as a learning

tool. I think I prefer separate manuals, but it is not a critical point.

Getting started

If you thought you could just pick up your package, insert the disk and run it, you find a big surprise. Even the getting started manual is 80 pages long! Be prepared to spend at least six to eight hours with this manual and the tutorial disk. The getting started manual is written for the first-time

The only thing that it does not do is laugh at your bad jokes or fetch coffee.

computer user. You know: "Press this, then press that, now look at the screen". The more experienced user can skip through it quite quickly. I did find a number of typographical errors in this manual but these should not cause too much pain.

Open Access Integration (another manual) appears to have been an afterthought: no pre-punched pages and cheaper quality paper and print. The message is important, however, and it explains the process and concepts of moving data within Open Access and into (and out of) Open Access from other modules.

Finally, there is the usual quick reference card/guide.

One must realise that documentation in a package with the sort of features found in Open Access must be extensive. Software Products International has done a reasonable job in finding the happy medium of providing good solid explanation and quick reference. Unfortunately, taking such a general stance must mean some users will suffer. I found that I needed outside help to set the default values in

the Communications module (this is not my forte). While we have access to such a consultant, other users may not be as fortunate. And this module, in particular, is quite difficult to follow from the manual alone.

Online documentation

One cannot ignore the Help screens as useful documentation. Although somewhat brief to begin with, I can understand that these have been set up as memory joggers more than as teaching aids. They are sufficient for experienced microcomputer users, allowing them to cheat a fair bit and not use the manuals.

Online tutorial

With a highly featured package such as Open Access, there is a great need to demonstrate the features in a simple fashion but, at the same, cover as vast a territory as possible. The method SPI chose with Open Access was to have a "hand-holding" demonstration disk accompanied by instructions in the getting started manual. This is the middle road between the Lotus Tutorial Disk (which I found a bit inflexible) and the "follow the written text method" of Multiplan and VisiCalc; a method that, alone, would not have worked with Open Access due to the number of features. (Basically, it would have taken too long to work through all the manuals.)

I found that, in some sections of the tutorial, things seemed to happen too fast. I was knocked out by the features and, although presented with a picture of what was possible, I was left with the feeling that I would never really conquer the package.

But then came the good parts.

There is a step-by-step written tutorial in the user manual, and the models in the demonstration disk are available for the user to experiment with (originally a great frustration for me with the Lotus tutorial).

The overall conclusion is that Open Access can indeed be conquered. SPI has, indeed, provided all the necessary

OPEN ACCESS

tools; but due to the sheer number of features Open Access will not be mastered in a day.

The modules

To have done justice to such a highly featured package I really should have dragged my PC over to my desk and used the package as I believe it has been designed to be used as the modern manager's electronic pencil, paper, telephone, diary, graph-paper, calculator, Teledex, filing cabinet, filing clerk and stenographer. The only thing that it does not do is laugh at your bad jokes or fetch you a cup of coffee (then again, I cannot get my staff to do so either).

Perhaps the best way to show how the package is designed for this kind of job is the Time Management Module. This is where we will start during our review of each of these modules.

Time manager

On entering the Time Management module, the system looks at the system date and returns the current calendar month. It displays the days along the top and five rows of weeks. Once again, if you have color this is great! By hitting the Page Up or Page

Down keys you can display following or previous months.

While in the Calendar mode, one can jot items down on the calendar (much as one would do manually). And if the small area on the day field is not enough, you can call up a scratch pad for further notes. The scratch pad is a great idea but I cannot work out why SPI did not allow the pad to scroll forward automatically (as their word processor does). Instead, one is beeped at the end of a line and forced to move down by pressing Return.

Once a day has been chosen one can schedule appointments (overlapping if necessary) indicating who with, when, where and how long, and on what subject (including some notes). The scheduler is complex enough to meet the needs of the most demanding of diary users, maybe even specialist doctors — people who seem to forever schedule more appointments than they can possibly cope with.

Using an advanced option, the manager can schedule regular appointments. This can be done daily, weekly, monthly, whatever. Nice one this...

The module also has an Address Book facility where you can keep the names, addresses, phone numbers of

all those people you deal with. No, I do not know how many names. I imagine it depends on your computer's storage capacity.

Overall, this module is very good so long as your computer is on your desk. I would not let my secretary process the Time Management module for me: it is designed to help managers use their time more efficiently, not create more work for the secretary.

Information management

One of Open Access's strongest attributes is its database structure. Its database commands are reminiscent of dBase II and SPI say the query language is derived from IBM's SQL (Structured Query Language).

A good database has some distinct advantages over the information processing features of a spreadsheet database such as that offered by Lotus 1-2-3. The main one, however, is that it offers an inbuilt Add, Edit and Delete facility that can take a reasonable amount of time to program, particularly if one wants to use stored keystrokes (macros) and employ data entry people who have not been trained in the spreadsheet.

The Information Management module allows the user to build screen masks for data input, even allows editing of data on input. The Design command allows the designer to specify a range within which a numeric field must lie. The Must Match feature is best explained by an example.

After setting up a customer file, you set up an invoice processing file. As you enter the customer code, the Must Match command comes into play, checking that the code exists on the customer file. Real systems development can be done with a tool like this.

This module has all the features and functions that one expects of a database and appears to have all the flexibility that one would expect. I can comment no further at this time as we did not develop any live systems in the database and, therefore, did not pass it through a thorough test.

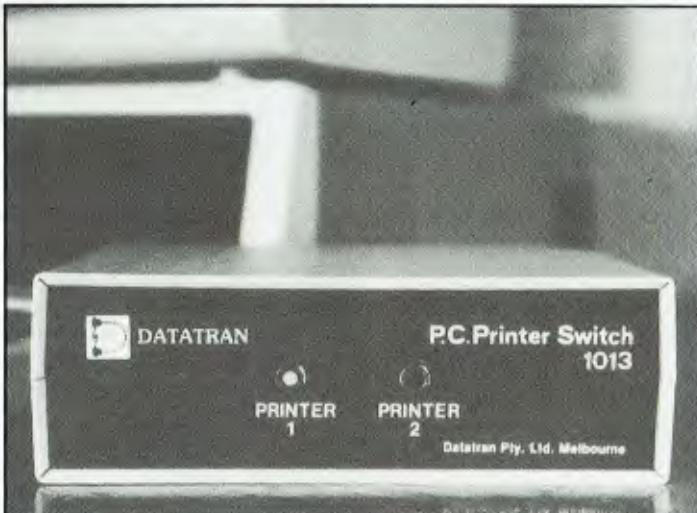
NAME	DIGITAL DESIGNS	UPDATED	(SYSDATE)
ADDRESS	6364 COMPLEX DR		
CITY	LOS ANGELES	STATE	CA
		ZIP	93324
CONTACT	HOWARD HUGHES		
PHONE	(213) 445-9241	DATE DUE	11- 1-83
PURCHASES	272056.00	OVERDUE	FALSE
PAYMENTS	257300.00		
BALANCE	14756.00		

Text |<movements><do><undo><menu><print<<calc><make ent>

The result of a file query using the database functions of Open Access.

PC PRODUCTS

PC SWITCH



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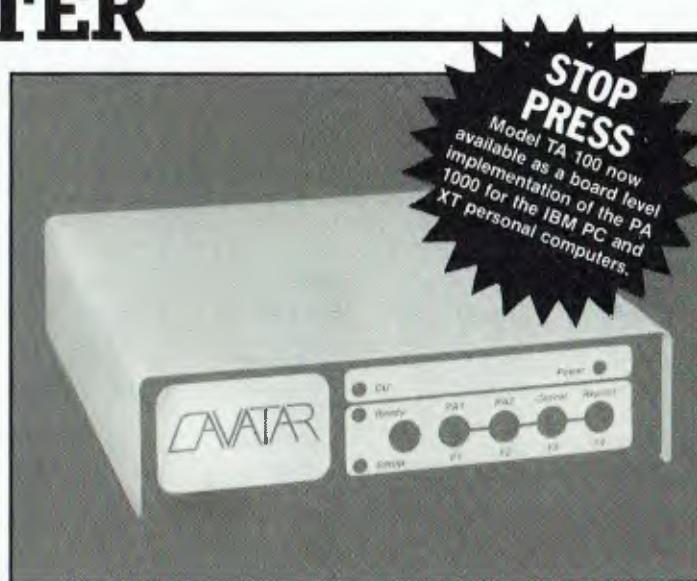
Model 1023 Universal switch.

Model 1033 Communications switch.

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The PA-1000 protocol converter allows your PC to emulate an IBM 3278-2 terminal. Virtually any Personal or Portable Computer can utilise the PA-1000 to emulate the 3278. IBM, APPLE, DEC, TRS80, KAYPRO, COMPAQ, NCR, EAGLE, and others. The PA-1000 also connects to the DEC VT100, IBM 3101, LSI ADM5, Televideo 910 and ADDS Viewpoint.

In addition to the coax connection, the PA-1000 provides an extra port. This gives you access to other local or remote asynchronous host computers or local printers. If you need it, there is an in-built HELP facility to "answer questions".



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DATATRAN

PO Box 88, Hawthorn 3122.
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OPEN ACCESS

The Open Access database facility bears a further examination.

Spreadsheet

The spreadsheet appears to lack nothing in features and, as a long-time spreadsheet user, I found myself chuckling away at some of the features.

For one thing, it's BIG: 3000 rows by HH columns (216 if my fingers do not lead me astray). It is a shame that SPI didn't offer the calculator feature in the word processing module of Open Access — it would be helpful here.

Here are some more new features. Passwords for protection of models. Debit/credit for plus and minus. Advance in a predetermined direction after pressing the Return key. This can be right to left or top to bottom. It speeds data entry without having to set up a macro. (SuperCalc does this too.) Get Attributes: when advancing, the cell's format will follow along. Sure beats formatting an unknown range of cells before data entry and slowing the speed of entry, or formatting after entry and living with the wrong format until data entry is finished.

Equation Window shows the formulas in one window while displaying the results in another.

Substitution will replace a value in a cell with factored increase but will keep the original figure available so that it may be switched back. The way this is done is very interesting. One enters "=" in front of an expression such as "1.25*!", this would multiply the contents of the cell by 1.25.

Goal Seeking: unlike Lotus or Multiplan — which will do goal seeking but hide the function beneath other functions — Open Access, brazen package that it is, displays the function on its main menu.

Save me: Open Access provides an automatic saving of files on exit of the system. One can decide to overwrite a file or create a new file at the time of quitting a model. If you are like me, you will enjoy this feature.

Learn and execute: hit the Return key in any module (although I did not try it in all of the modules) and Open Access starts recording your keystrokes.

These can be rerun at a later stage of processing. This is a neat idea; I only wish that they would let you edit the stored keystrokes — or introduce some program logic.

Spreadsheet Command Selection Menu

Auto	Blank	Copy	Delete	Edit	Format	Goal Seek
Help	Insert	Locate	Name	Order	Print	Quit
Recalc	Setup	Transfer	Update	Window	Xternal	

<arrow> <do> <undo>

Spreadsheet commands available in Open Access.

W1	A	B	C	D	E
1	PROFIT				
2					
3	YEAR	REVENUE	OPERATING EXPENSES	PROFIT BEFORE TAXES	
4					
5	1983	\$1,000.00	\$800.00	\$200.00	
6	1984	\$1,050.00	\$840.00	\$210.00	
7	1985	\$1,102.50	\$882.00	\$220.50	
8	1986	\$1,157.63	\$926.10	\$231.53	
9	1987	\$1,215.51	\$972.41	\$243.10	
10					
11	GROWTH RATE		1.05		
12					
Model DATA:PROFIT 87% Pointer: A1 Current: A1 LR W:1 #0					
G O A L S E E K I N G					
DEPENDENT Variable		TARGET Value	INDEPENDENT Variable	REQUIRED Value	
A1					

Spreadsheet example with iteration table for "what if" testing.

All good? I'm afraid not

The greatest criticism one can level at this spreadsheet is its lack of speed. VisiCalc was faster.

I entered the number 1 in cell A1. (The default format on the spreadsheet is two decimals). This cell was then copied down and across to cell F18, 108 cells all told. This exercise took the computer about 28 seconds to perform from the time I hit Go.

Further problems were experienced when I tried to copy this first cell, A1, down and across to HH3000. Well, 10 minutes later I decided to press Control, Alt and Del to return to the operating system. The little message at the bottom of the screen, "Working, Please Wait", gives one no joy.

Such tests are not really a good measure of the package. One cannot but remember, however, the failure of

Context MBA to take a significant share of the integrated package market, when its only significant failing when compared feature-by-feature against Lotus 1-2-3 was its lack of speed. We have only recently been asked to help a client convert his MBA files to run under Lotus. Evidently the speed of processing was so significant that he would rather pay the costs of conversion.

One suggestion that we did not try was to create and use a RAM disk. This we see as being particularly helpful if you have a PC rather than the XT we used. We did not try this as when we were conducting the above timings it was apparent that the hard disk was not being accessed. Apparently all calculations were being performed in RAM.

But SPI is not ignorant of the speed question. The company has taken some steps to circumvent the problem: the default setting is to have the recalculation mode off; the spreadsheet allows, no, even encourages you to recalculate just one row at a time; a message lets you know your calculation is being performed; and Open Access provides good access to other spreadsheets so that you can easily modularise your work (it does make good sense to use the database for storage of large files rather than use the spreadsheets).

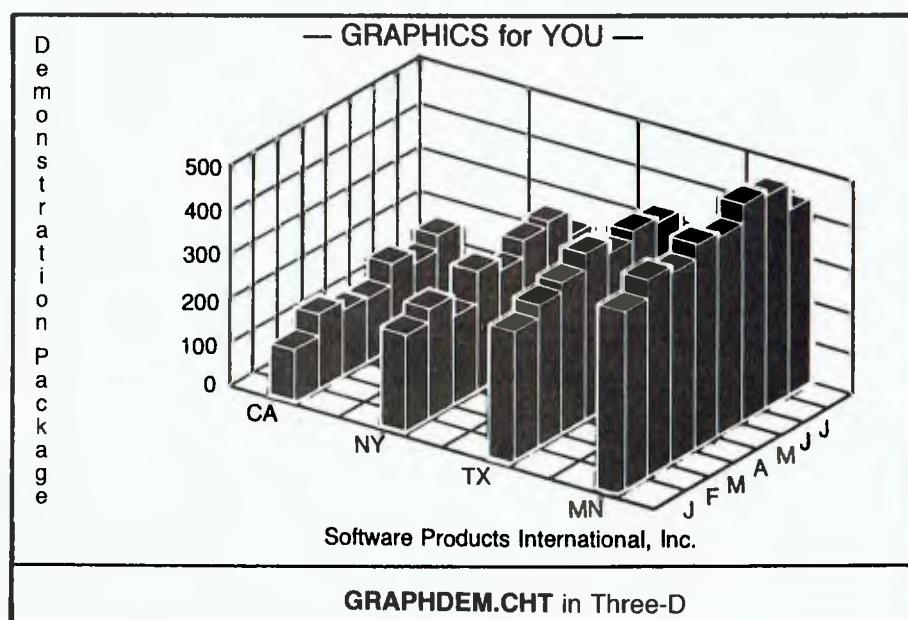
The spreadsheet has all the features you would expect and some more that you did not; but it can be a little frustrating if you intend to work with all the 3000 rows and columns (something that I could not attempt to do).

Graphics

Breathtaking is the only word to describe Open Access's graphics presentation. I thoroughly enjoyed producing three-dimensional graphs. There is something dramatic about the way these graphs are drawn on the screen. First, it draws the titles for the X, Y and Z axes. Then it draws the grid patterns and then, block by block, it creates the solid image graphical representations of the numbers from

your spreadsheet or database. If only we could print them! (All we need, of course, is three-dimensional recording material, perhaps glass or clear plastic.) Some large organisations are not

satisfied with the graphic options available with most of the integrated packages. They want to be able to overlay graphs, display a different Y axis on the right-hand side of the page,



Three-dimensional bar chart from demonstration program.

1L — P — 2 — 3 — 4 — 5 — 6 — R —
January 6, 1984

Mr. Hal Stevenson, President
Fortune Financial
500 W. Bay St.
San Francisco, Ca. 90736

Dear Mr. Stevenson,

It is a great pleasure for me to inform you that the fruits of our last few meetings are beginning to appear. We received the final 1983 sales figures for our new 64 bit micro, SUPER 64, and it appears that your advice has steered us in the right direction. Sales for the fourth quarter were up 27% for an overall year's increase of 22%.

Summarized below are the sales figures by region and quarter for SUPER 64.

Word Processor — Menu

DELETE: Deleting moves — <Ret>, <Bs>, <Par Fwd>, <Par Back>, <Sent Fwd>, <Help>, <Sent Back>, <Word Fwd>, <Word Back>, <moves> <Do> <Undo> <Menu> <Help> <Ins> <Search>

Test and menu display with word processor in delete mode.

OPEN ACCESS

explode a pie graph and so on. Open Access can do it.

In particular, I like the one-page approach to defining the graphic options. You don't have to skip between menus and options to display all the selected features.

One can: introduce data from standard interface files or enter data directly to the graphics module or

transfer data from either the database or the spreadsheet; select palettes and colors; hit one key and display the graph; display a slide show (in this case, the operator can select and display a series of graphs by just hitting one key between selections).

Here is a package a manager can really show off with. "You want to see that as a graph?" "How about this!"

Communications

We seemed to get stuck at every turn with the communications module. We couldn't configure it. Our communications consultant couldn't do anything with it, an outside consultant had more problems and then our modem packed it in! This is a case of "try before you buy". We couldn't see it working.

Word processing

Okay, we are familiar with a number of other word processing packages, but we were able to use this one without reading the manual. It is the easiest word processing packages ever designed.

This article was written using it and, with little difficulty, we selected tabs and fonts and all the usual things needed in word processing. We loved working in color as it highlights what we are doing.

Perhaps it is not a word processor one would give a secretary, but even a demanding manager would find its features satisfactory.

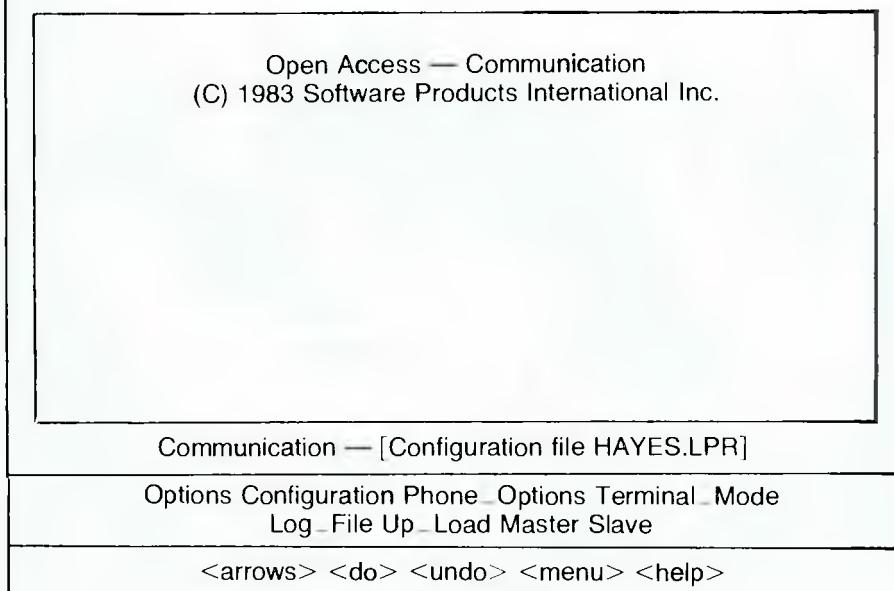
Conclusion

This is a package that, I believe, has been designed for the manager's desk. It has all the features one expects: a good spreadsheet, a database to speed up the collection of data, a diary for the busy manager (and don't we all think we are busy), graphics for better presentation, a word processor and electronic mail facility. There are a few facilities in this package that I have not had a chance to mention; it really is very comprehensive!

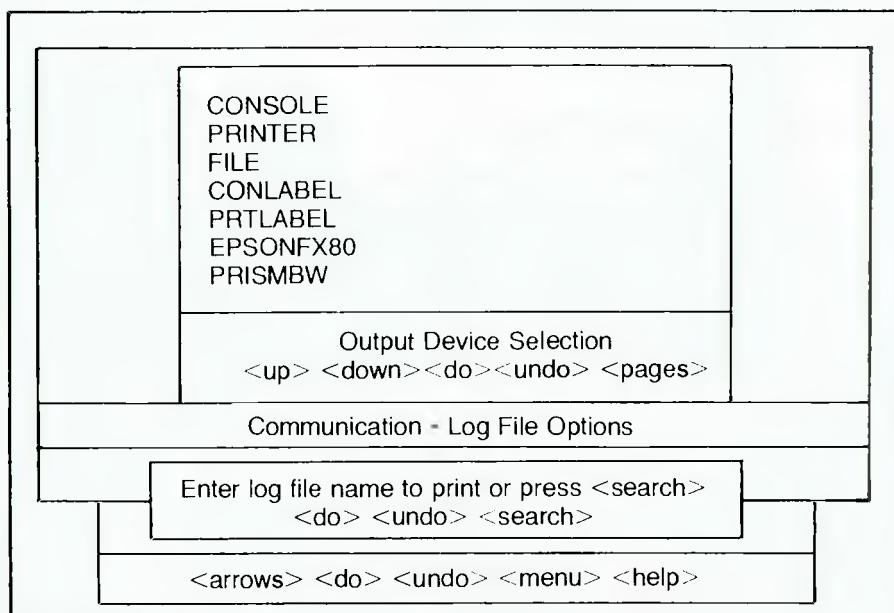
If only the spreadsheet were a little faster, then Open Access would rate very highly.

PC

Ron Pollak works for management consultants Ron Pollak & Co, 146 Sussex St, Sydney 2000. (02) 29 5316.



Communications function menu with default Hayes protocol selected.



Output device menu for selecting destination of communications log file.

FRAMEWORK

Framework® is the first of a new generation of products that goes beyond today's integrated spreadsheets. It is an order of magnitude better than the original integrated products and windows.

The heart of Framework is a unique "frames" technology. Frames are actually self-contained, inter-related displays that can be nested, resized and relocated anywhere on the screen. Frames bring new flexibility to the way information is created and managed with a PC. With this truly three-dimensional design, the user can create infinite logical hierarchies of information, leading to as deep a level of complexity as needed for the task at hand. There is no limit to the number of frames that are active in the system. Framework's user interface is one of the most elegant designs yet conceived.

Word Processing

Framework's word processor is dynamite! It gives users the choice of frame or fullscreen viewing of documents, multiple margins within a single file, automatic justification and repagination, header/footer, page numbers and more. The streamlined menu system helps new users get started in a hurry and "shorthand" commands help veterans work even faster.

Outlining

The innovative and very powerful outline processor can be used as a standalone organizer or as a companion to the word processor. Using this outline mode, single ideas can be quickly captured and then expanded into fuller concepts and solutions. Any outline-frame or subheading within an outline can be instantly expanded to include text, spreadsheets, graphs or databases. Finally, with Framework, your PC is truly a thinking machine.

Database

Framework's database system can be learned quickly and put through its paces effortlessly because most commands are common throughout the entire program. Framework itself will handle most of your analytical information management needs, and if very large data handling is required, Framework is fully compatible with dBASE II®.

Spreadsheet

Spreadsheets are simple to create, use traditional row/column or English-language cell addresses, can be linked to automatically update other files based on cell data and have an exclusive international numerics feature that will change entries to accurately reflect changes in currency denominations including the placement of commas and decimal points.

Graphics

The graphics portion of Framework has been designed to produce exceptional charts and graphs on standard monochrome monitors. Six of the most frequently used business graphs are built-in and can be automatically drawn and updated from data in spreadsheets and database files.

DOS Access

The new DOS access capability allows any user to actually run other PCDOS software inside Framework. This allows users to gather data from other programs without quitting Framework. It will be of great help to people who frequently shuttle between programs and to businesses who perform frequent interchange of programs or data with larger systems.

Custom Applications

Framework comes complete with its own programming language. Users can begin writing their own custom packages or use software developers right away. In addition, dealers will continue to receive the excellent support that

has helped make Ashton-Tate the front-runner in the software industry with dBASE II and FRIDAY!

Hardware

Framework will run on the IBM PC, PC XT and all compatibles. It requires just 256K RAM and dual 360Kb floppy disk drives with monochrome display.

Availability

Framework will be available in Australia from the end of July. Contact your dealer end-June for more details or write to the Master Distributor, ARCOM Pacific, Freepost 2 (no stamp required), P.O. Box 13, Clayfield, Qld. 4011.



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One of the earliest word processors, Magic Wand, meets WordStar and produces a product that is very easy to use. Les Stein reviews Palantir.

PALANTIR: Striving for Useful Power

I must confess to a pessimism for word processors. Over the years, I have bought each package with initial optimism, browsed through the manuals with a preliminary "uh-oh" or two, before being reduced to worry about whether my overdraft (already a candidate for the Guinness Book of Records) should have been extended further for such as this.

There is no way of telling if a word processor is what you want until you fiddle with it. Easywriter, we find, is not easy; VisiWord is said to have been created (according to one magazine) by a cross between the Marx Brothers and the Three Stooges, yet receives the fourth-highest rating in a review of 30 packages by another. It is not letting the cat out of the bag to say that salespeople would happily sell you a complete disaster (Lousywriter?) and have little knowledge of new products and are prone to saying: "It's the best there is."

Having been thrown back time and again to old trustworthy WordStar, but seeing the exasperation of others over its control sequences, I was intrigued by a rumor that Palantir had become the word processor of choice at a number of major US universities. It was

said to be so easy and logical to use that it gained quick acceptance.

Palantir comes with a bit of a legend. Its writer and designer, Mike Griffin, developed Magic Wand, an early and clunky word processor. He obviously sold the ownership to Peachtree who turned it into Peachtext, the IBM word processor.

But, being a clever man, as Palantir shows, he went back to the drawing board and produced a program which some say was meant to be a balance between the simplicity of Magic Wand and the versatility of WordStar. The advertising for Palantir says it is the "no bull" word processor. If you write off for information, you get a "no bull" button.

There is no such word as Palantir as far as I can make out. There were the ancient towns of Palantia (Spain) and Palantium (Arcadia), but neither were known for anything relevant.

The best clue is the Greek root "palin" which means "to do again" as in palindrome or, more appropriately to the program, palingenises (the regeneration of a new animal from a dead decaying one) or — if you permit me one more — palimpsest (the parchment which has been used more than once for writing and the original

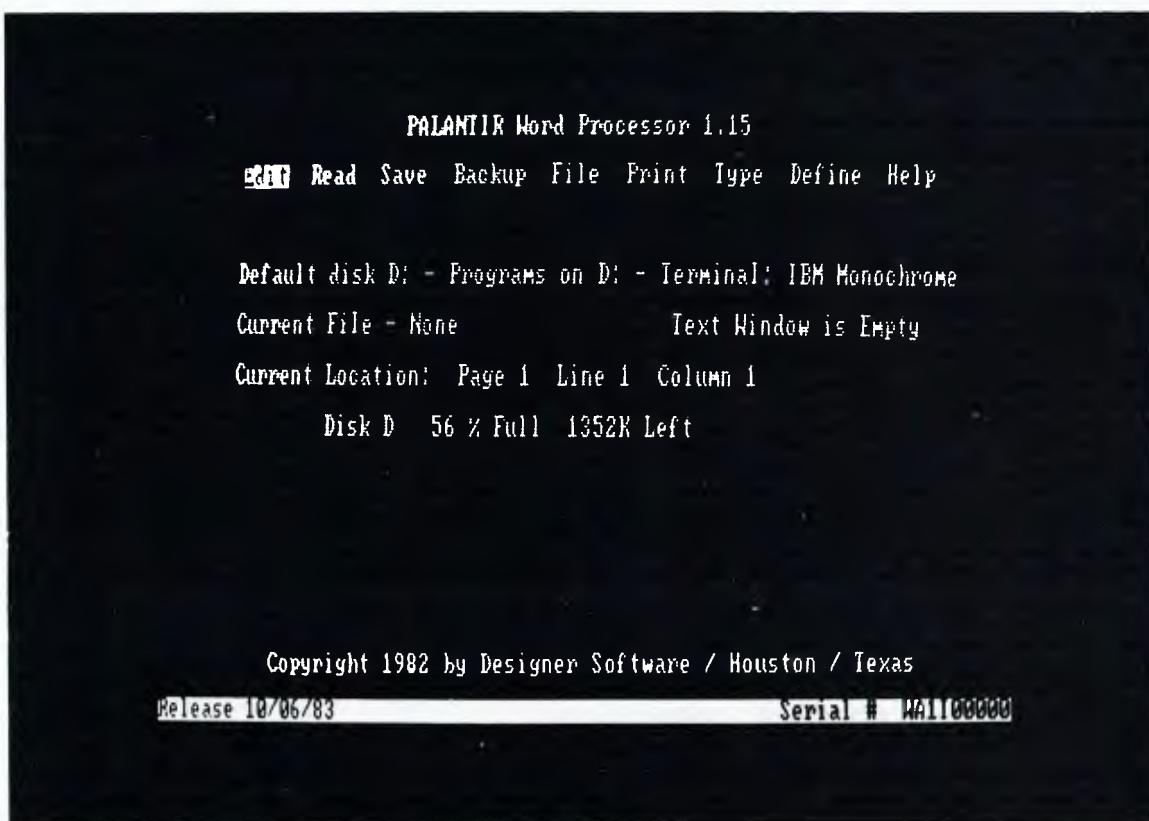
has been erased). The logo of the program is a bird rising from flames which could be the phoenix rising from its own ashes with renewed youth.

It certainly is not a Griffin (as in Mike Griffin). I've speculated that there could be some arcane message of a mystical nature in the manual, but couldn't find one ... Unless it's in the print section under "Other Options..."

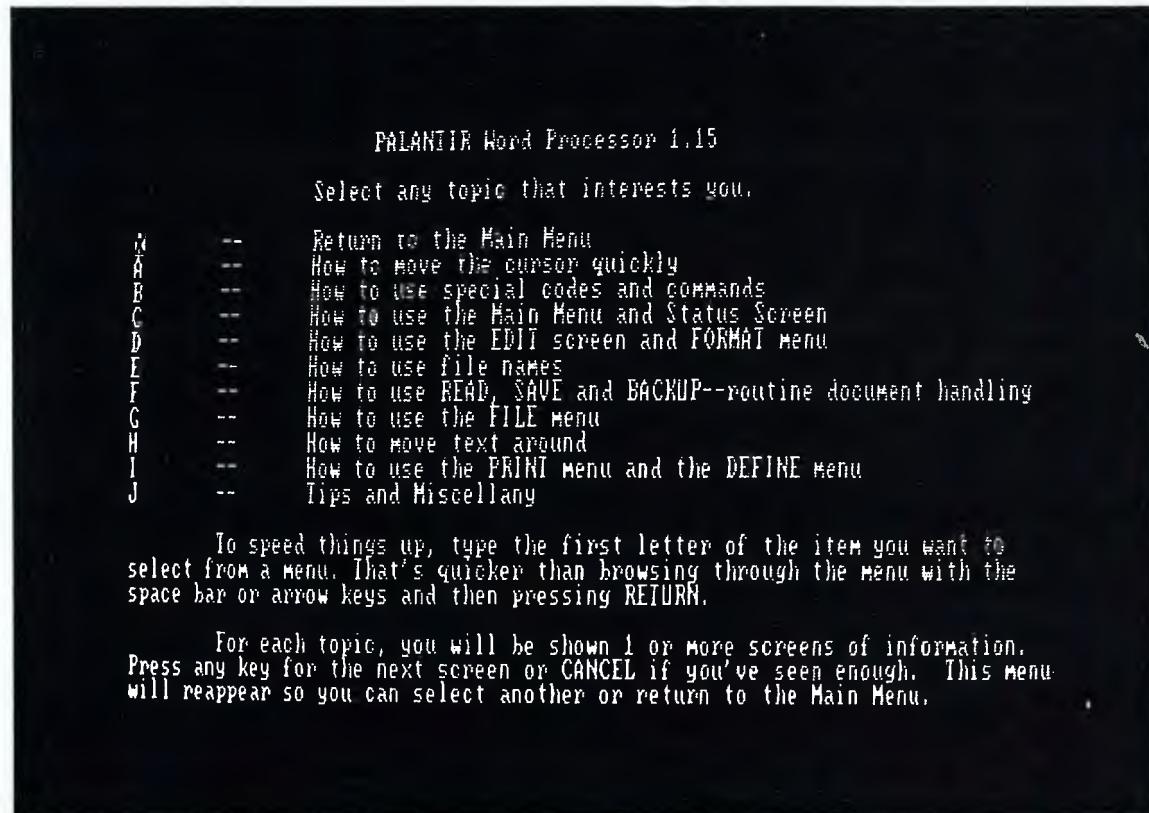
You notice with horror that the manual says nothing about the PC or versions of PC-DOS or what function keys can be used for. The manual is written for CP/M versions and, if it was not for a magazine article, I would not have known what the IBM version did without making my way through several Help screens.

You do feel as if you are getting your older sibling's hand-me-downs when you deserve better. I cannot even contemplate that this will continue, and must assume that special notes will be forthcoming for the PC.

The major disappointment (not quite a horror) is that the PC version does not use memory-mapping whereby a new screen full of text literally jumps into place. The new version of WordStar (3.3) has this feature, as do many other word processors designed for the PC (such as MultiMate). As it is



Palantir main menu, showing no open text file.



Palantir help screen.

only one instruction to the 8088 processor, it is not difficult to implement on the PC, so there is little excuse for omitting it. As well, sub-directories for DOS 2.0 cannot be used from within the program.

Main menu

Choices are made on the main menu just as with Lotus 1-2-3; you either move the space bar to the command and press Enter or simply hit the first letter of the command. This works smoothly and seems to be the best system short of using a mouse. The main menu is not particularly aesthetic, but it is functional.

There is one feature which stands out from the main menu, making the package more attractive. Inspect allows you to browse through any file (much like the DOS Type command) without having to read in the file to edit it. This somewhat remedies the measly eight characters and three-character ending allowed under PC-DOS and CP/M-86 and makes it easy to see what you put in GRNDKLJ.SDF. Perhaps Palantir owes us this, as it only allows files to have eight letters while supplying a mandatory WP ending.

Another feature, called Type, is more of a challenge than a feature. It allows you to type through direct to the printer for envelopes, one-line notes and the like. Its problem is its unforgiving nature. Not even a backspace is allowed and consequently should only be used when the kids have stopped their music lessons.

Help is available only through the main menu. This is not necessarily a problem, as one can leave an editing session by pressing Esc, returning just as quickly.

Help gives you 25 screens of information about every aspect of the program. It took me about 30 seconds to seek out the array of cursor movements using Help, while using the manual to do the same thing took a minute.

The manual certainly has a fine index (as manuals rather than textbooks go), but it is written more as an essay than a

set of instructions. It seems more tedious than necessary. There is little white space, and one page can describe five to 10 different aspects of a part of the program.

How it works

Palantir is based on a philosophy that all commands should reflect the same structure. First, you start something or turn on a function or attribute by pressing F1 for Set. Second, you

P alantir is based on a philosophy that all commands should reflect the same structure.

decide to continue with it by hitting Enter or cancel it by hitting Esc. In some cases, as when you need to turn off an attribute, you hit F2 to Clear. For example, to use the bold face attribute, you hit F1 for Set and then hit !, which is the symbol for boldface. When finished, hit F2 for Clear.

Marking a block for deletion has only one Set command, Set Del. The block is highlighted as you move the cursor; Enter will execute the delete.

All blocks, incidentally, can be marked by indicating the letter or full stop which is your destination and that will be highlighted. This feature is derived, I believe, from Wang's word processor. The only way to delete a word is to hit Set Del, then Space. You delete a sentence, Set Del, then "...".

There is no special method for deleting a line or deleting copy by hitting to the end of a line or from a character to the beginning of line. All deletion must use the process of defining a block to delete.

The uniformity of the Set and Clear

sequence makes Palantir consistent and straightforward. But I often found myself wondering whether a command I Set needed to be Cleared, such as a header or footer (they don't need to be). After about a week of using the program, I had no doubts, but I became aware that I had memorised the commands much as I had with WordStar.

I was not working along with Palantir's over-riding philosophy that should lead me intuitively to the right keys. There is a cluttered section of my brain that contains Control OT, and the like, for Wordstar. Now, unfortunately, a new section contains things like Set Insert if I want Palantir to give me a hard carriage return.

There are several nice aspects to Palantir that should find their way to other packages. Set and right arrow will cause whatever is typed to move out from the right margin. This right justification is particularly useful with dates.

With WordStar, I always type dates apprehensively, fearing involuntary word wrapping if I go too far to the right. There is also a decimal tab which aligns numbers at the decimal point (now in WordStar 3.3 and in MultiMate).

Cursor movement

The versatility of movement within a document is crucial to a writer. To move quickly to the beginning or end of a line or document is the basic minimum. Movement by word is handy and movement to a page number would be a bonus, and something I miss when using WordStar.

Palantir uses a system of movement similar to the Select word processor. F3 defines direction and will cause an arrow on the top status line to face left (for up) or right (for down). The PC has up and down arrow characters, which would appear to be more appropriate, unless this is a very subtle matter of design philosophy, rather than a CP/M vestige.

The function keys to the right of the

function key pad section have the following designations: F4 (Line), F6 (Screen), F8 (Page), and F10 (Document).

After setting the direction (F3) and the method of scrolling, you move quickly, considering memory mapping is not used. The PC keys of PgUp, PgDn and End are not used.

Home will take you first to the beginning of a line and, when pressed again, to the start of the screen, and if hit yet again, to the last line of the screen (the same system as in Peachtext). To get to the end of a line, you need to hit the right arrow before hitting Home; unwieldly to use.

You can, however, move rapidly to any character by hitting F5 for Find and then the character; handy to get to the end of a sentence. A nice feature in the midst of this cumbersome system is the ability to Set Home, travel around and return quickly to that spot.

I found the number of key strokes needed to move anywhere (although considerably fewer than others such as Word Perfect) was a major limitation to using the program on a PC. The Palantir version I used gave me the impression I was still using an 8-bit machine and that the power of the PC was restricted.

I had the impression it was a great program for CP/M or an Apple or, better still, to replace the awful Scripsit on the Tandy. But it's a bit too cumbersome and slow for the PC.

Two nice features

There are several features of Palantir that deserve separate mention. The first is called Lexicon, a file of up to 36 words or phrases (up to 250 characters) that can be pulled into your document by function key F9 and a single letter such as S which could stand for Signature. I had trouble remembering what stood for what and eventually confined myself to two or three commonly used phrases.

The second notable feature is a find-and-replace function that operates in the “quiet” mode. A global replace is done without you having to watch the

screen scroll by. The new WordStar also has this capacity, but it is not common among word processors.

Mailout

Mailout is a mail-merge system which comes with Palantir. It is comprehensive, easy to use and works with any type of data file that is carriage return or comma limited (including random access files written in Basic). It is a high-class piece of programming and adds great life to Palantir (as it does in similar form to Peachtext).

It is easier to use than any other system (WordStar/Mailmerge, Spellbinder, MultiMate, Perfect Writer/Filer) I have tried.

Within a document, you hit Set and C (for command) to perform a large range of Mailout tasks. It can do the usual job of merging documents at print time, displaying messages for an operator for forms use or using another file as a data file. It has a mini-programming language which allows conditional expressions such as "greater or less than", "if, then" and others which can be used to evaluate data for inclusion into variables such as

name or city. With And-and-Or statements and arithmetic calculations, Mailout is comprehensive and, in practice, infinitely easier to use than others I have come across.

Printing

Palantir caters for an enormous range of printers; there is a driver file for any you could imagine. At the time of printing you can easily change printers. The manual says: "To our knowledge, Palantir is the only word processor that allows you to do this..."

There is also a standard driver called BUILTIN.WPP, which is always called up at the time of printing. To use my Diablo 630, I had to tell the program to change from built-in to Diablo every time until I found (undocumented) I could change the name of the Diablo file to BUILTIN.

Other shortcomings

Palantir is not a what-you-see-is-what-you-get word processor. Right justification is seen only at print time, as is double spacing. A major deficiency is the inability to see what the finished



Palantir text file of a form letter showing merge commands.
Text to be printed is highlighted.

PALANTIR

product will look like before printing; even Zardax for the Apple has that feature.

Here is a short list of other things missing, although they may be also missing from many other word processors.

Palantir cannot edit one file while printing another. Nor can it generally "undo" mistakes. Palantir recommends

you mark a block for moving, which places the block in the buffer and causes it to disappear. You can then call it back, but this is certainly not a proper "undo" function. Palantir cannot use a mouse. Nor can it specifically manipulate or format columns, or use the PC extended character set. It does not do footnotes (just footers), there is no math

capability and you cannot change the function key arrangement.

Other advantages

Palantir does have virtual memory capacity which allows your document to be larger than available memory. As far as I can tell, it will use only 64K-bytes of that memory — no matter how much is aboard. It is also compatible with the PC XT or other hard disk systems and is as fast as you would expect on a RAM emulator. It has soft hyphenation and the ability to set a multitude of format lines within one document.

It allows you to change formats at print time and does not require you to save a document before printing, which is handy for quick drafts. It also allows horizontal formats of more than 80 characters.

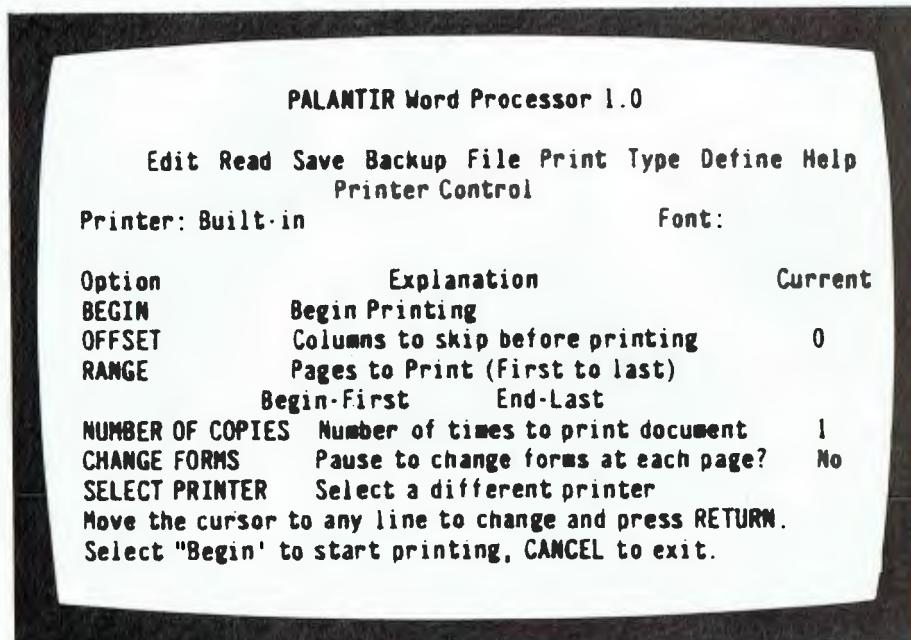
Who is it for?

If you use a PC primarily for word processing, Palantir is not for you. You need memory-mapped screens, fast cursor movement, a range of delete options and perhaps the ability to see how the document will look printed. Palantir rates very low on all these fronts.

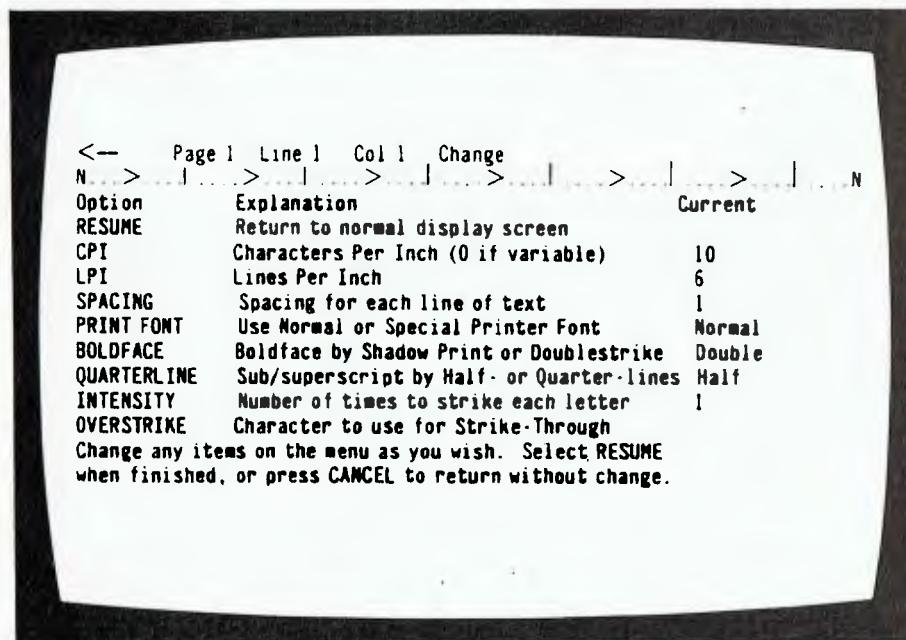
If your word processing use is tangential to other computer uses or you have no word processing experience and want something that does the job and is bug-free, Palantir may be it. It would be fine for letters and excellent if you need a mail-merge facility. It can be used with little training and has a tutorial which is part soap opera, but instructive.

Its philosophy of Set and Clear can be understood readily and the Esc key can get one out of any difficulty. It is really a word processor for beginners who will stay beginners.

PC



Palantir printer control menu.



Palantir format menu, with printing options. Format changes are not reflected in screen display of text.

Les Stein is a long-time microcomputer user. He works at the law school in the University of Western Australia.

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Every month a few more distributors acquire PC compatibles. Australian PC World continues its bimonthly survey of PC compatible computers available in Australia.

PC Compatibles in Australia

DESKTOP PCs

Emtek-PC

The Emtek-PC features serial and parallel ports, and a disk drive controller, all built in to the main system board. Externally, the Emtek-PC is identical to the IBM PC, apart from the slimline disk drives and Keytronics keyboard. MS-DOS version 2.00 is the only software supplied with the Emtek-PC. Available options include a 10M-byte fixed disk, a game controller and a Chinese character adapter. List Price: \$3388.

Emona Computers Pty Ltd, PO Box K720, Haymarket, NSW 2000. Tel: (02) 212 4815.

Fox 2001

The President Computer Group has leapt on to the PC compatibility bandwagon with the release of the Fox 2001 personal computer. Although the keyboard is a fairly good replica of the PC keyboard, the system unit and monitor look cheap and plastic. The base model has eight onboard expansion slots, three of which are taken up by the display adapter, disk controller, and

multifunction card (which includes parallel and two serial ports, clock/calendar, and RAM expansion sockets). All system RAM is located on the multi-function card, which is claimed to make servicing and upgrading simpler. MS-DOS version 2.00 and the Perfect Series (Calc, Writer, Speller and Filer) are bundled with the Fox 2001 package. List Price: \$3668 (green screen); \$3910 (color screen). President Computers, 100 George St, NSW 2077. Tel: (02) 476 2700.

Intertec HeadStart 512

Intertec's dual-processor business computer is an MS-DOS compatible machine that features the 8086 and the Z80A, 512K-bytes or 1M-byte of RAM, a RAM disk, multi-user networking capability, and a single 3½in disk drive. The HeadStart is small by desktop standards (38cm x 30cm x 27.5cm) and weighs about 12kg.

Although it functions as a single-user computer, the HeadStart is easily integrated into Intertec's 225-workstation network, which supports electronic mail, file locking and password security. A 5¼in disk drive is available for storage and

downloading software to the system's standard 3½in drive. Applications software has not been formally announced, but several popular MS-DOS programs (such as Lotus 1-2-3) run on the system. List price: \$4495. Biztronics, 68 Patterson Rd, Moorabbin 3189. Tel: (03) 557 5855.

ITT XTRA

In keeping with its corporate image, ITT has produced a very professional compatible. The XTRA is not functionally superior to the PC, but the machine is solidly built and backed by a company as ubiquitous as IBM.

The system offers features similar to the PC's; supports a monochrome or a color display, a mouse, and Microsoft Windows; and according to company literature, "complements" ITT's Courier 3270 data terminals.

ITT claims that the XTRA is software and hardware compatible with the PC. ITT allowed a preproduction XTRA to be tested at their Comdex booth until one program, GW Basic, failed to load on the system. But WordStar, PC-DOS 1.10 and 2.00, 1-2-3, and Flight Simulator were successfully run,

indicating that the XTRA is likely to be very compatible with the PC. List price: \$5745 with twin drives and 256K-bytes RAM.

STC Pty Ltd, 80 Mount St, Nth Sydney, NSW 2060. Tel: (02) 438 4977.

Monroe System 2000

Launched at the recent Data 84 show in Sydney, the Monroe System 2000 is one of the "new generation" compatibles, incorporating an 8MHz 80186 processor and quad-density slimline disk drives (720K-bytes). The base model includes 128K-bytes of RAM, (expandable to 896K-bytes), two serial and one parallel port, a single disk drive, a battery-backed calendar clock, and five expansion slots. Expansion options include slimline fixed disk drives (10 or 20M-bytes) and a Z80A coprocessor card.

List Price: \$5464.

Pace Computer Services, 4 Help St, Chatswood, NSW 2067. Tel: (02) 411 7888.

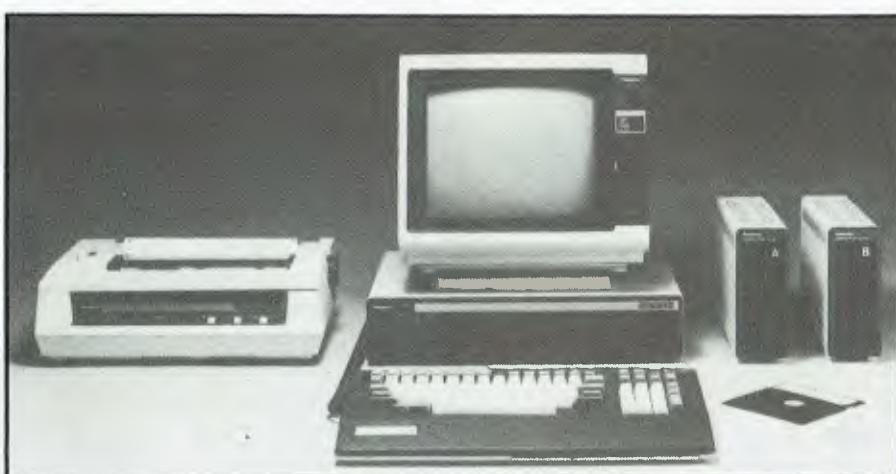
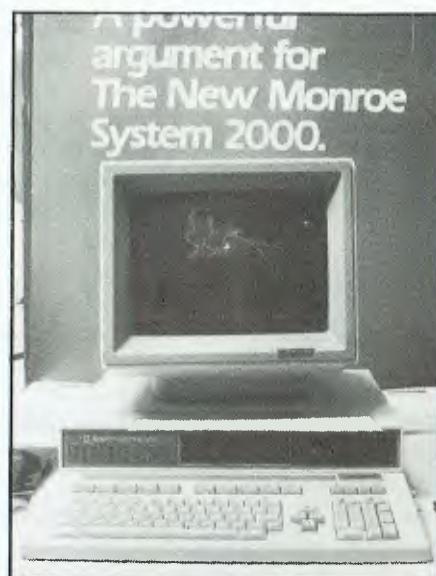
Panasonic JB-3000

One of the earliest PC compatibles to appear was the Panasonic JB-3000 from Japanese electronics giant Matsushita. This machine differs from most compatibles by having a selection of optional 5 1/4in and 8in external disk drives. Capacities are 720K-bytes for 5 1/4in drives and 1232K-bytes for 8in drives. A fixed disk (8.4M-bytes) is also available. The basic JB-3000 has an 8088 processor, 128K-bytes of RAM (expandable to 256K-bytes), a single 5 1/4in disk drive, built-in color graphics, three expansion slots, parallel printer ports and a monochrome monitor.

The PC compatibility of the JB-3000 was promoted heavily but now would be regarded as MS-DOS compatible.

List Price: \$4800.

The Computer Co, 369-385 Wattle St, Ultimo, NSW 2007. Tel: (02) 20 951.



Top left: Fox 2001 includes Perfect software.

Top right: The Monroe 2000 was launched at Data 84.

Above: Panasonic JB-3000 has optional disk drives.

Left: TeleVideo Tele PC is very compatible.

PC COMPATIBLES

Pantek

Pantek Australia has released the PC-16 and PC-16-E personal computers, and hopes to achieve a sales target of 1000 by the end of its first full year of operation. Bundled software includes the T/Maker III package, which combines word processing, list management and graphics. The base model PC-16 contains 128K-bytes of RAM and two 360K-byte slimline disk drives, while the more expensive PC-16-E has a 10M-byte MiniScribe fixed disk and 256K-bytes of RAM. Both models have Keytronics-style keyboards and parallel and serial ports standard. The Pantek PCs are assembled in Taiwan and contain a system BIOS conforming to standards laid down by the Taiwanese government's ERSO committee. Assembly in Australia is scheduled for 1985, and nationwide maintenance is to be undertaken by Hills Industries Ltd.

List Prices: \$3610 (PC-16); \$6429 (PC-16-E).

Pantek Australia Pty Ltd, 43 McCubbin St, Burwood, Vic 3125. Tel: (03) 288 6651

Tava

The Tava PC strongly resembles the IBM PC in looks and operation. The system has power-on diagnostics and mirrors the PC in keyboard design and character set. The Tava's standard equipment

includes 128K-bytes of RAM (expandable to 640K-bytes) and dual 320K-byte disk drives. The system runs MS-DOS 1.1, 2.0, and 2.1 and includes a USI board that supports monochrome and color displays. The system will run all the test software except Xenocopy. Rebooting in the middle of a program is easy and quick. The Tava's IBM-style keyboard has a soft action and may be frustrating for fast typists. The basic unit features two serial ports, a parallel port, MS-DOS 2.0 and an Amdek Series 300 monochrome monitor.

List Price: \$4199.

S.T. Research Pty Ltd, 6 Axon St, Subiaco, WA 6008. Tel: (09) 381 4462.

TeleVideo Tele PC Tele XT

The TeleVideo Tele PC (TS 1605) and recently-released Tele XT (TS 1605H) are software, hardware, and disk compatible PCs, with serial and parallel ports, a 14in monitor, color graphics and MS-DOS Version 2.11 all supplied as standard. The Tele PC starts with 128K-bytes of RAM and two 360K-byte floppy disk drives, while the Tele XT has 256K-bytes of RAM, a single 360K-byte drive and a 10M-byte fixed disk drive. TeleVideo is also expected to support its PC range on multi-user networks by the end of the year. The TeleVideo PCs are very

compatible, running IBM versions of all applications software, and should run most PC software except Xenocopy.

List Prices: \$5415 (TS 1605); \$7975 (TS 1605H).

Data Peripherals Pty Ltd, 9 Avon Rd, North Ryde, NSW 2113. Tel: (02) 888 5733.

Wang Professional

It had to happen eventually — Wang has given in to the current trend and released its own PC compatible. The 8086-based Wang Professional Computer has an expansion 101-key keyboard and a high-resolution (800x300) monitor, with 128K-bytes of RAM standard (expandable to 640K-bytes). The Wang PC is being marketed as part of a large family of office automation products rather than as a standalone solution. As one would expect from Wang, an enhanced word processing package is available, along with most of the Microsoft languages, including Compiled Basic, Fortran, Cobol and Pascal. The Wang PC also has a workstation emulation mode, which allows it to act as a VS, OIS, Alliance 250, or 2200 Series terminal.

List Price: \$5280.

Wang Computer Pty Ltd, 10 Paul St, Milsons Point, NSW 2061. Tel: (02) 929 5144.



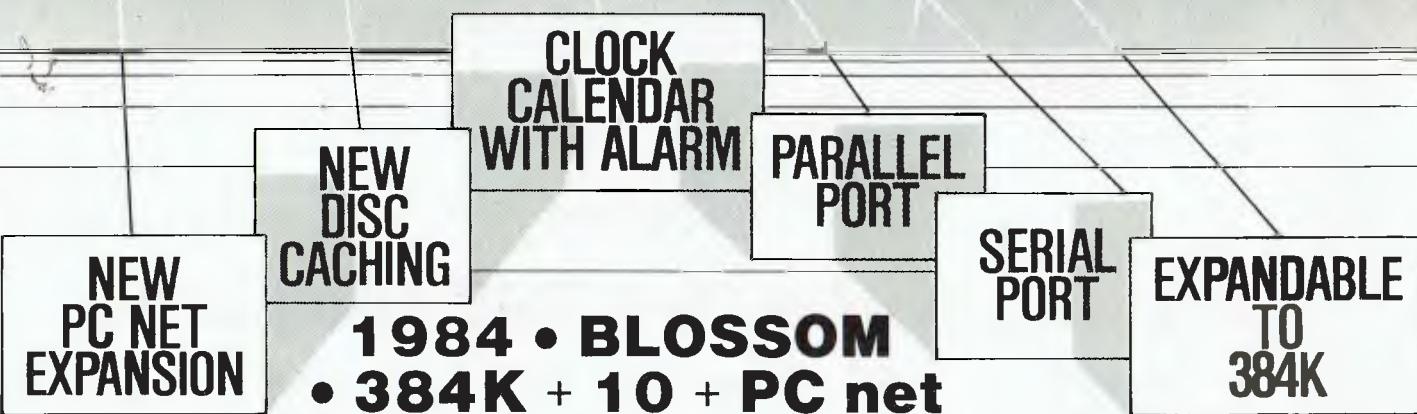
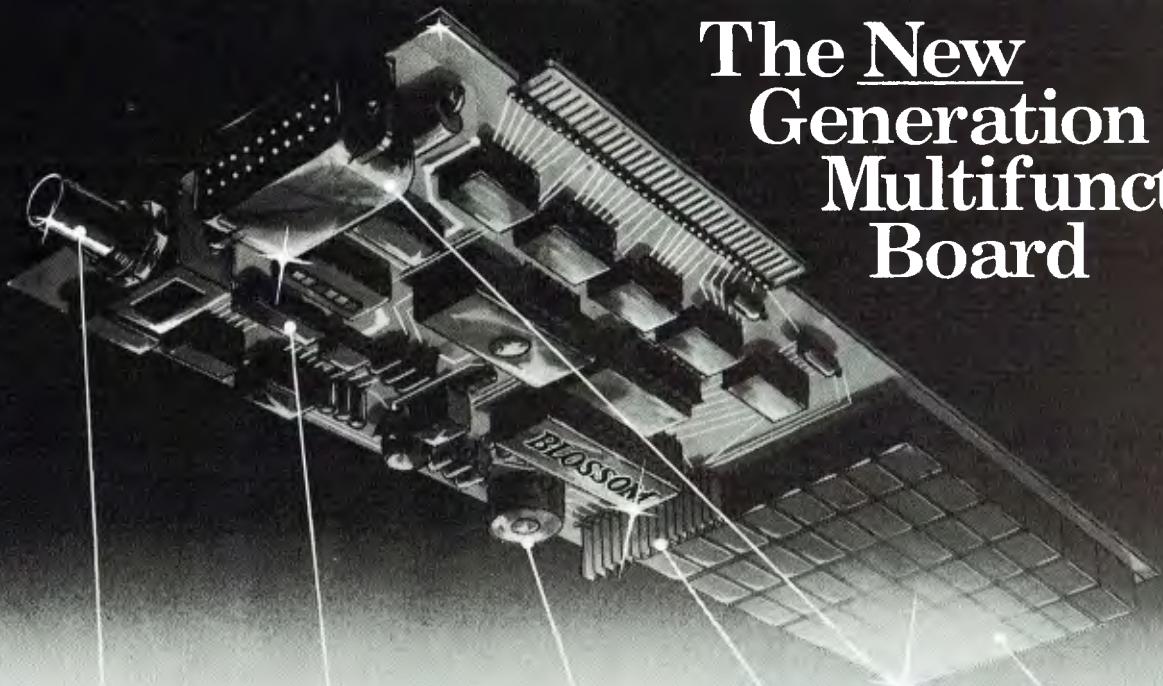
The Taiwanese Pantek PC-16.



The Wang Professional has workstation emulation mode.

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PC COMPATIBLES

DESKTOP PC COMPATIBLES

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								Size	storage	dens./side
IBM PC	\$5225	8088	yes	256K	256K	640K	1 parallel	5	5 1/4	360K DD/DS
Canon AS-100	\$6800	8088	no	128K	256K	512K	1 parallel 1 serial	0	5 1/4	640K DD/DS
DEC Rainbow 100	\$5184	8088 Z80A	yes	64K	256K	—	1 parallel 1 serial	0	5 1/4	400K DD/DS
Dick Smith Challenger	\$3398	8086	yes	128K	256K	640K	1 parallel 1 serial	3	5 1/4	360K DD/DS
Emtek-PC16	\$3388	8088	yes	128K	256K	768K	1 parallel 1 serial	5	5 1/4	360K DD/DS
Intertec Headstart	\$4495	8086 Z80A	no	512K	512K	1M	1 parallel 1 serial	0	3 1/2	500K DD/DS
ITT Xtra	\$5200	8088	yes	128K	256K	640K	1 parallel 1 serial	5	5 1/4	360K DD/DS
NEC APC H02	\$6121	8086	yes	128K	256K	640K	1 parallel 1 serial	0	8	1M DD/DS
Olivetti PC	\$4270	8088	yes	128K	—	512K	1 parallel 1 serial	4	5 1/4	320K DD/DS
Olympia People	\$5495	8086	yes	128K	—	512K	1 parallel 1 serial	4	5 1/4	655K DD/DS
Panasonic JB-3000	\$4800	8088	no	128K	256K	—	1 parallel	—	5 1/4	720K DD/DS
Radio Shack TRS-80 2000	\$5333	80186	no	128K	256K	768K	1 parallel 1 serial	0	5 1/4	720K DD/DS
Sanyo MBC 550	\$3316	8088	yes	128K	256K	—	1 parallel 1 serial	4	5 1/4	160K DD/DS
Sharp MZ 5500	\$3995	8086	yes	256K	512K	—	1 parallel 1 serial	0	5 1/4	320K DD/DS
Sigma 40	\$5000	8088	yes	128K	256K	—	1 parallel 1 serial	—	5 1/4	320K DD/DS
Sirius	\$6036	8088	yes	128K	256K	896K	2 parallel 3 serial	0	5 1/4	600K DD/DS
Sperry PC	\$4673	8088	yes	128K	128K	640K	1 parallel 1 serial	7	5 1/4	360K DD/DS
Stearns Desktop	\$2353	8086	yes	128K	—	896K	1 serial	1	5 1/4	640K DD/DS
Tava PC	\$4199	8088	yes	128K	—	640K	1 parallel 2 serial	—	5 1/4	360K DD/DS
TeleVideo PC	\$5400	8088	yes	256K	256K	640K	1 parallel 1 serial	5	5 1/4	360K DD/DS
Toshiba T-300	\$5185	8088	yes	192K	256K	512K	1 parallel 1 serial	0	5 1/4	640K DD/DS
Vector 4S	\$6715	8088 Z80B	no	128K	256K	—	2 parallel 2 serial	0	5 1/4	720K DD/DS
Vector SX	\$7512	8086 Z80B	yes	128K	896K	—	2 parallel, 2 serial	0	5 1/4	720K DD/DS
Wang Professional	\$5280	8086	yes	128K	—	640K	—	—	5 1/4	— DD/DS

PC COMPATIBLES

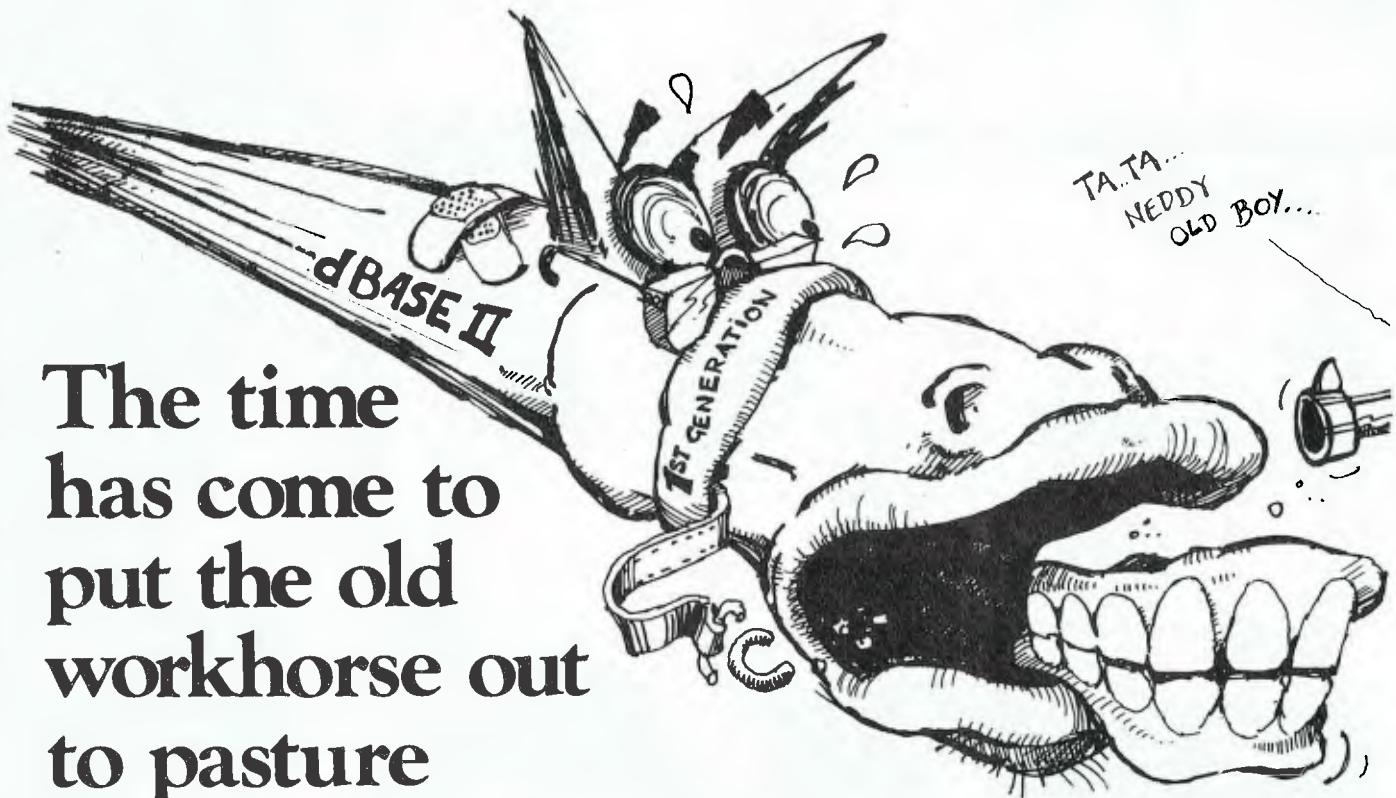
DESKTOP PC COMPATIBLES

	Hard disk ³ supported	type ⁴	Video monitor			Keyboard			
			resolution ⁵	colors ⁶	format ⁷	IBM layout ⁸	fully definable	full IBM char. set	function keys
IBM PC	10M	mono color	720 x 350 640 x 200	16	80 x 25	yes	yes	yes	10
Canon AS-100	10M	mono color	640 x 400 640 x 400	8	80 x 25	no	no	no	12
DEC Rainbow 100	10M	mono color	800 x 240 800 x 240	16	80 x 24 132 x 24	no	yes	no	20
Dick Smith Challenger	10M	mono color	640 x 200 640 x 200	8	80 x 25	yes	no	yes	10
Emtek-PC16	—	mono	—	—	80 x 25	—	—	—	—
Intertec Headstart	10, 50M	mono	924 x 240	—	132 x 25	no	yes	no	18
ITT XTRA	10M	mono color	720 x 350 640 x 200	16	80 x 25	yes	yes	yes	10
NEC APC	10M	mono color	640 x 475 640 x 475	8	80 x 25	no	yes	no	23
Olivetti PC	10M	mono color	640 x 325 640 x 325	8	80 x 25	yes	no	yes	10
Olympia People	10M	mono color	640 x 475 640 x 475	16	80 x 25	no	yes	yes	12
Panasonic JB-3000	8M	mono color	640 x 400 320 x 200	8	80 x 25	no	yes	no	8
Radio Shack TRS-BO 2000	10M	mono color	800 x 400 640 x 400	16	80 x 25	no	n/a	yes	12
Sanyo MBC 550	10M	mono color	640 x 400 640 x 400	8	80 x 25	yes	yes	yes	5
Sharp MZ 5500	10M	mono color	640 x 400 640 x 400	8	80 x 25	no	yes	no	10
Sigma 40	—	mono color	640 x 400 640 x 400	8	80 x 25	yes	yes	yes	—
Sirius	10M	mono	800 x 400	—	132 x 50	no	yes	no	10
Sperry PC	10M	mono color	640 x 240 640 x 400	16	80 x 25	yes	yes	yes	10
Stearns Desktop	5, 10, 20M	mono	720 x 364	—	80 x 26	no	n/a	yes	10
Tava PC	—	mono color	720 x 350 640 x 200	16	80 x 25	yes	yes	yes	10
TeleVideo PC	10M	mono	604 x 200	—	80 x 25	yes	yes	yes	10
Toshiba T-300	10M	mono color	640 x 500 640 x 500	16	80 x 25	no	yes	yes	10
Vector 4S	5, 10, 36M	mono color	640 x 312 640 x 312	16	80 x 25	no	yes	no	15
Vector SX	10, 36M	mono color	640 x 312 640 x 312	16	80 x 25	no	yes	no	15
Wang Professional	10M	mono	800 x 300	—	—	no	yes	yes	—

Operating system	Software included ⁹	Additional Hardware Included ¹⁰
PC-DOS 1.12.0/2.1, CP/M-86, CCP/M-86	ROM BASIC	
MS-DOS 1.25, CP/M-86	MS-DOS 1.25, Canon BASIC, GW BASIC, MailMerge, SpellStar, WordStar	graphics
MS-DOS 2.0, CP/M-86	CP/M-86	—
MS-DOS 2.0	MS-DOS 2.0, GW BASIC, Perfect Software	—
MS-DOS 1.1, 2.0, 2.1 CP/M-80, CP/M-86 ITT DOS 2.11	MS-DOS 2.0 CP/M-80 ITT DOS 2.11 ROM BASIC	—
MS-DOS 2.0, CP/M-86 CCP/M-86	—	graphics
MS-DOS 1.25/2.00, CP/M-86, UCSDp	MS-DOS 2.00, GW BASIC, PC Tutor, WordStar, 5 MicroPro packages	—
MS-DOS 1.10/2.00/2.10, CP/M-86, CCP/M-86 MS-DOS 2.1, CP/M-86	MS-DOS 2.10, CP/M-86, CBASIC	128K RAM only
MS-DOS 1.10/2.00	—	—
MS-DOS 1.1	MS-DOS 2.00, MS-BASIC Executec	
MS-DOS 1.1	MS-DOS 1.1, MS-Basic	graphics
MS-DOS 1.1, CP/M-86	CP/M-86	—
MS-DOS 1.1	MS-DOS 1.1, MS-BASIC	color monitor
MS-DOS 1.10/2.00/2.10, CP/M-86	MS-DOS 2.10, BASIC	
MS-DOS 1.25/2.00, CP/M-86 UCSDp	MS-DOS 1.25, GW BASIC, diagnostics	—
MS-DOS 1.25/2.00, CP/M-86, MP/M-86, ST-DOS, CCP/M-86 MS-DOS 1.1, 2.0, 2.1 CP/M-86, UCSDp	MS-DOS 1.25	—
Tele DOS 2.11 CP/M-86, CCP/M-86	—	Graphics
MS-DOS 1.10/2.00/2.10, CP/M-86	MS-DOS 2.10, TBASIC-16, Perfect Software	—
MS-DOS 2.1, CP/M-86	MBASIC-80 Memorite, Execuplan	Graphics, S100 bus RGB output
MS-DOS 2.1 CP/M-86	MBASIC-80 Diagnostics, utilities	Graphics, S100 bus RGB output

Where both a desktop and a portable version are available, details of the portable version only are included:

1. Retail price, including tax, for monochrome system without optional graphics, twin floppy disk drives, 256K- bytes of RAM, 1 serial and 1 parallel port, MS-DOS 2.0 or equivalent. In some cases, the prices may refer to a less optioned system.
2. RAM supplied with base system.
3. Internal hard disk. Amounts for external hard disks not included.
4. Displays available, not necessarily as standard.
5. Monochrome text resolution and mono/color graphics resolution.
6. Maximum number of colors or intensities at lowest graphics resolution.
7. Characters per line by lines per screen.
8. Similar to the PC, but not necessarily an exact copy.
9. Additional software included in base price.
10. Additional hardware included in base price.



The time
has come to
put the old
workhorse out
to pasture

The days when dBASEII* stood all by itsel', at the apex of the database management pyramid are past. The old workhorse has been put out to pasture by a new breed of faster, easier, more powerful packages. It's not that the old horse hasn't done its job: it has, gloriously. Those of you using dBASEII know that it has paid for itself many times over. In its time it was dBest. And now there's no denying that it's slow, it's cumbersome, it's difficult to live with — when you compare it with some of the newcomers on the market.

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Delta:

We regard it as the most complete user-oriented database system on the market today and for the foreseeable future. Delta caught our attention when it received the UK government's prestigious RITA award for "best software of its kind", followed closely by IBM UK's adopting it as their own distributed product for the IBM PC. Everything we have learned about it since working with it here has served only to increase our enthusiasm. Delta has so much to offer — and you don't have to be a programmer to get it all.

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Dataflex is a true multi-file, multi-user database management system. "Flex" offers you unlimited flexibility in the development of high quality, easy to use database applications – in a minimum of time. "Flex" is for software developers everywhere, as well as for users with complex applications.

Take some advice from an experienced punter.

“Dataflex . . . truly the best application development tool on the market today. Its power and flexibility have enabled us to write a total package in less than 50% of the time compared to conventional methods.”

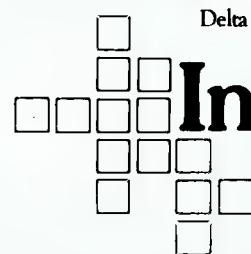
Tim Lamberton, M Sc.
software consultant to
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Delta and Dataflex are available at leading computer stores everywhere. Ring up your local dealer and ask him for a demo. If he doesn't know about the product you're interested in, ring us. Or better yet, have your dealer ring us. It's time he got on the inside track.

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South Melbourne VIC 3004.
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Brisbane: (07) 343 9122 **Perth:** (09) 322 1677

PORTABLE PC COMPATIBLES

	List price ¹	Processor	8087 socket	RAM (min.)	RAM (max.)		Ports	Disk drives			
					on mother-board ²	including expansion		PC exp. slots	Size (in.)	storage	dens./ side
IBM PC (desktop)	\$5225	8088	yes	64K	256K	640K	1 parallel	5	5 1/4	360K	DD/DS
ACT Apricot	\$5712	8086	yes	256K	256K	768K	1 parallel 1 serial	0	3 1/2	315K	DD/DS
Columbia VP	\$4795	8088	yes	128K	256K	512K	1 parallel 1 serial	1	5 1/4	320K	DD/DS
Corona Portable PC	\$5325	8088	yes	128K	512K	1M	1 parallel 1 serial	4	5 1/4	320K	DD/DS
Dulmont Magnum	\$5674	80186	yes	64K	256K	—	1 parallel 1 serial	0	—	—	—
Eagle PC Spirit	\$5470	8088	yes	128K	640K	1M	1 parallel 2 serial	4	5 1/4	360K	DD/DS
Hyperion	\$5500	8088	yes	256K	256K	640K	1 parallel 1 serial	0	5 1/4	328K	DD/DS
Dtronix Attache 8:16	\$4995	8086 Z80A	yes	256K	256K	—	2 serial	0	5 1/4	320K	DD/DS
Seequa Chameleon	\$4995	8088 Z80A	yes	128K	256K	704K	1 parallel 2 serial	0	5 1/4	160K	DD/DS
Sharp PC5000	\$2700	8088	no	128K	256K	256K	1 serial	0	5 1/4	360K	DD/DS
Texas Instruments Portable Professional	\$5480	8088	yes	64K	768K	768K	1 parallel	5	5 1/4	360K	DD/DS

Where both a desktop and a portable version are available, details of the portable version only are included:

1. Retail price, including tax, for monochrome system without optional graphics, twin floppy disk drives, 256K bytes of RAM, 1 serial and 1 parallel port, MS DOS 2.0 or equivalent. In some cases, the prices may refer to a less optioned system.
2. RAM supplied with base system.
3. Internal hard disk. Amounts for external hard disks not included.
4. Displays available, not necessarily as standard.
5. Monochrome text resolution and mono color graphics resolution.
6. Maximum number of colors or intensities at lowest graphics resolution.
7. Characters per line by lines per screen.
8. Similar to the PC, but not necessarily an exact copy.
9. Additional software included in base price.
10. Additional hardware included in base price.

PORTABLE PC COMPATIBLES

Hard disk supported ³	type ⁴	Display			Keyboard			
		resolution ⁵	colors ⁶	format ⁷	IBM layout ⁸	fully definable	full IBM char. set	function keys
IBM PC	10M	mono color	720 x 350 640 x 200	16	80 x 25	yes	yes	yes 10
ACT Apricot	10M	mono	800 x 400	—	132 x 50	no	yes	yes 14
Columbia VP	—	mono color	640 x 200 640 x 200	16	80 x 25	yes	no	yes 10
Corona Portable PC	10M	mono color	640 x 325 640 x 200	16	80 x 25	yes	yes	yes 10
Dulmont Magnum	—	LCD	480 x 80	—	80 x 8	no	no	yes 12
Eagle PC Spirit	10M	mono color	720 x 352 640 x 200	16	80 x 25	yes	yes	yes 10
Hyperion	10, 20M	mono	640 x 250	—	80 x 25	no	no	yes 10
Otronix Attache B:16	10M	mono	640 x 250	—	80 x 25	no	no	no 0
Seequa Chameleon	10M	mono color	640 x 200 640 x 200	16	80 x 25	yes	yes	yes 10
Sharp PC-5000	—	LCD	640 x 80	—	80 x 8	no	no	yes 8
Texas Instruments	5, 10M	mono color	720 x 350 720 x 350	8	80 x 25	no	yes	first 96 12

At the time these tables were compiled, IBM announced price reductions for all its personal computer products, but specific details had not been released. Other distributors may alter their prices to maintain the old price relationship with the PC. These tables reflect only some of the price changes.

Weight (kg)	Dimensions (cm)	Monitor size [in]	Battery pack	Operating system	Software included	Hardware included ¹⁰
—	—	—	—	PC & MS-DOS 1.10/2.00/2.10, CP/M-86, CCP/M-86, UCSDp, others	ROM BASIC	—
6.4	46 x 11 x 35 30 x 24 x 24	9	no	MS-DOS 2.00, CP/M-86 CCP/M-86, UCSDp	CP/M-86 2.00, CCP/M-86, BASIC, Supercalc 3, SuperPlanner 3, communications	—
14.5	49 x 43 x 21	9	no	MS-DOS 1.25, CP/M-80/86 CCP/M-86, MP/M-86	MS-DOS, CP/M-86, BASIC, macro assembler 10 applications	—
12.7	54 x 49 x 27	9	no	MS-DOS 1.10/1.25, CP/M-86 PC Tutor, 7 utilities	MS-DOS 1.25, GW BASIC, MultiMate.	—
3.5	32 x 17 x 4	—	yes	MS-DOS	word processing, spreadsheet, communications	—
14.9	49 x 43 x 22	9	no	MS-DOS 1.10/2.00/2.10, CP/M-86, CCP/M-86, UCSDp	MS-DOS 2.10, CCP/M-86, BASIC	—
8.2	49 x 30 x 24	7	no	MS-DOS 1.10/2.00, CP/M-86	MS-DOS 2.00, MBASIC, Aladdin DBMS	clock, color graphics board, modem board
9.1	46 x 32 x 16	5	yes	MS-DOS 2.10, CP/M-86	MS-DOS 2.10, CP/M-86, Chariton II, Valet	clock,
12.7	49 x 43 x 22	9	yes	MS-DOS 1.25/2.00, CP/M 2.1/2.2, CP/M-86, CCP/M-86, UCSDp	MS-DOS 1.25, MBASIC-86, Perfect Calc, Perfect Writer, 3 applications	color graphics
4.3	35 x 32 x 11	—	yes	MS-DOS 1.10/2.00	MS-DOS 2.00, GW BASIC, Supercomm, SuperWriter	—
14.5	51 x 43 x 16	9	no	MS-DOS 1.10/2.10, CP/M-86, CCP/M-86, UCSDp	—	—

The Corona PC, one of the first American-designed PC compatible computers, has provided Australian electronics company AWA with an opportunity to promote the Pick operating system as an applications solution for microcomputer users. David Keith reviews the Corona PC and PC portable.

Corona Picks a Compatible Position

AWA is one of Australia's oldest electronics companies. It has a successful computer business based on packaging Microdata minicomputers with a version of the Pick operating system. This powerful applications development tool has enabled AWA to promote its Realty and Sequel range of machines as an applications solution to business.

When a version of Pick, called Revelation, became available on the PC, AWA saw an opportunity to complement its range of minicomputers. The company looked for a PC compatible system it could distribute and chose the American designed and manufactured Corona PC.

Corona was one of the first PC compatible systems. It was designed by Bob Harp, a highly regarded microcomputer engineer who

founded and designed all of the Vector Graphic systems. When he left Vector Graphic he started Corona, building standalone hard disks then designed a PC compatible system.

The primary reasons for considering an IBM PC-compatible computer instead of the original are mother-board RAM expansion capability, user-friendliness, additional hardware features, bundled software (applications software included in the purchase price of the computer) and, perhaps most important, price. Corona has admirably addressed these issues with two new computers.

The desktop Corona

The desktop Corona PC has an obvious resemblance to the IBM PC.

The Corona chassis offers several improvements, however, including double rows of slots along both sides to aid cooling. This, along with the necessary but very noisy fan, should provide more than adequate cooling even if all four expansion slots are filled.

By taking out four screws, the top of the computer can be removed in less than a minute, providing easy access to the four available expansion slots and the memory sockets. To provide additional support, Corona has provided adjustable, vertical rear guide slots for the expansion boards. The Corona comes standard with 128K-bytes of RAM and is expandable to 512K-bytes on motherboard sockets located directly beneath the expansion slots. The IBM PC offers a maximum of 256K-bytes of RAM on the motherboard before the



user must add memory expansion boards.

While Corona does supply a socket for inclusion of the Intel 8087 floating-point math coprocessor, it is located under the left disk drive. After eight screws have been removed, the entire disk drive, power supply, and inner framework release and swing back as a unit, permitting access to the motherboard. The expansion boards must be removed, however, before the disk drive and power supply assembly can be safely moved back.

The Corona motherboard includes (direct memory access) floppy disk controllers, one parallel and one serial RS232C I/O port, and a video monitor controller (monochrome). This leaves all four expansion slots available for the addition of any IBM PC-compatible expansion boards. By comparison, a similarly configured

IBM PC will have only one expansion slot free.

The Corona PC comes standard with one MPI double-sided floppy disk drive; an additional double-sided floppy drive or an internally mounted 10M-byte Winchester drive is optional. The floppy drives on two of the four computers I tried were annoyingly loud when transferring data; the drives of two others were relatively quiet. As soon as slimline floppy drives become more readily available, Corona will offer two in the space normally occupied by one full-height drive. This will permit you to add a hard disk without sacrificing one of the floppy disk drives.

The Corona power supply is a 110-watt unit (almost twice the 63 watts provided by the IBM PC but not quite as large as the IBM PC XT's 130-watt unit), and it can be switched from 220

volts to 110 volts to permit operation almost anywhere in the world.

The Corona features the Keytronic copy of the IBM PC keyboard, which has a different feel, a very light touch that can promote rapid typing, although some users may find it disconcertingly soft. It also offers LED indicators on the CapsLock and NumLock keys to provide a quick indication of when these keys are activated. The keyboard has two position adjuster feet in the back to adjust its angle.

On the negative side, the Keytronic keyboard retains some of the shortcomings of the IBM PC keyboard: the strange positioning of the left Shift key and the Enter key, along with the symbols instead of words for Tab, Enter, Shift, and Backspace. Changing the keyboard layout to match that of the IBM

Selectric typewriter would be welcome, and it might also help to have the F, and J and the numeric keypad 5 more deeply indented to assist the touch typist in finding the home position.

Hopefully, both IBM and the companies making compatibles will soon opt for the more logical horizontal layout of the function keys utilized by most of the new 16-bit microcomputers. Horizontal layout makes it easier to display the definitions of all the function keys on the screen. But until IBM makes that change, Corona will probably keep the IBM-style keyboard to retain maximum compatibility. This layout is at least easy and comfortable to work with for extended periods.

The keyboard attaches below the front of the chassis via a coiled 1.8 metre cord, an arrangement that allows greater separation between the keyboard and the main processing unit than is possible with the IBM PC

rear keyboard attachment system.

Perhaps the Corona PC's most noteworthy feature is its monitor, with its advanced graphics and character resolution capability. The 8-by 8-dot character resolution of the monochrome monitor driven by the IBM Color/Graphics Adapter is difficult to look at for any length of time. By comparison, Corona has chosen to provide high-quality characters on a high-contrast, high-resolution, nonglare, P-31 phosphor screen (the type with the fastest refresh). With a character font of 14-by 13-dot resolution in a 16 by 13 matrix, Corona surpasses virtually all other currently available personal computers with the possible exception of the more expensive NEC Advanced Personal Computer. I found the Corona monitor easy to read and have not experienced eye fatigue, even after extended periods of use.

To accommodate such high-

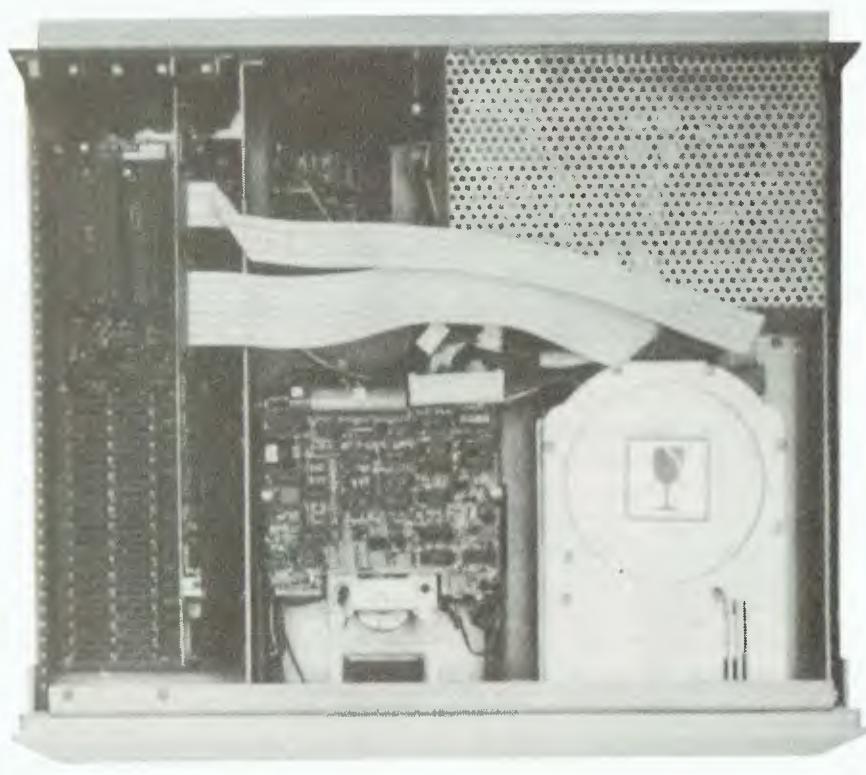
character resolution, Corona simply uses a larger ROM, allowing actual control over every dot within the 16 by 13 matrix. By always lighting up two adjacent dots, the vertical and horizontal strokes of the characters can be balanced, thus allowing a gradual shifting of dots and very smoothly sloping characters. This high resolution is particularly evident in the smooth, tight curves of the lowercase characters. Corona has also eliminated conflicts between various character attributes, thus enabling characters to be displayed in any combination of attributes including underlining, blinking, high intensity, and reverse video.

As much an improvement as the character resolution is the enhanced graphics of the standard 12in Corona CRT. Corona permits graphics and text to be displayed on the screen at the same time, and it permits fine resolution of images, including representations of photographs. With Corona's graphics storage in main memory instead of an RS232C serial port, several images can be stored at the same time, and those images can be swapped rapidly on the screen.

It is currently necessary to instal an IBM PC-compatible color board to connect a color monitor. Of course, the same is true for an IBM PC equipped with a monochrome monitor.

Portable PC — to go

Corona is taking a jump on the market by offering both a desktop and a portable model with virtually the same features and capabilities. The portable, which is heavy enough at 13kg to more properly be called a "transportable computer," differs from the desktop model only in its smaller (9in) monitor and in its inability to mount the Corona full-height hard disk internally. In all other respects it matches its desktop brother feature for feature, including its 512K-byte maximum RAM capability and space for four full-sized IBM PC-compatible expansion boards. With the same graphics and



Corona PC portable showing (from left) expansion slots, floppy disk drive and hard disk drive.

HOW COMPATIBLE?

Perhaps the biggest question facing a prospective IBM PC-compatible computer buyer is that of software and hardware compatibility. The Corona is designed to run the software available for the IBM PC from third-party vendors. In fact, Corona is committed to full compatibility with the Documented IBM PC Standard.

Australian PC World uses the following classification scheme to rate computers on their compatibility with the IBM PC.

Level 1: Media compatible. Machines that have the ability to read and possibly to write disks in the format used by the PC.

Level 2: Processor compatible. Machines that use an 8088 microprocessor or an 8086. While the two microprocessors are functionally identical, the 8086 can perform some operations more rapidly, which may cause problems for timing-sensitive programs.

Level 3: Operating system compatible. Computers that support MS-DOS, CP/M-86, or some other popular PC operating system.

Level 4: Component compatible. Machines that can use plug-in circuit boards designed for the PC.

Level 5: Character set and

keyboard compatible. Machines that display the same characters as the PC for each of the 256 character codes and that have keyboards that include all the same keys as the PC's.

Level 6: Video compatible. Machines that use the same video interface as the PC. The video must be memory mapped and located at the same memory addresses used in the PC.

Level 7: System compatible. Machines that duplicate the PC's entire architecture. RAM, ROM, I/O, and all other addresses reside in the same locations as those in the PC, including the routines in the BIOS ROM.

The Corona PC and Portable PC come close to attaining Level 7 compatibility, but due to the BIOS ROM, they must be rated at Level 6. In fact, the Level 6 rating is absolutely valid in monochrome mode but requires an IBM-compatible color graphics board to be at Level 6 in the graphics display mode.

The Corona offers improved monitor resolution of 640 by 325 pixels (versus 640 by 200 for the IBM PC). To accommodate the same memory-mapped locations as the IBM PC, the Corona simply multiplies the Y-axis of the point to be plotted by 1.6, which is done through one instruction for the 8088 CPU.

Another important area that must be supported without impinging on IBM copyrights is the

contents of the ROM BIOS. One of the problems here is that the version of MS-DOS supplied by Microsoft to manufacturers other than IBM is assembled to run in a slightly different location from IBM BIOS. Corona had to make modifications in DOS in order to preserve a compatible ROM communications area. It has also supplied equivalent functions for disk copy utilities, disk compare utilities, and mode utilities.

In fact, the only basic point of operational variance from the IBM PC is that Corona can't offer the IBM-copyrighted ROMs. But by preserving the same entry points into DOS, it is able to preserve compatibility with most third-party software.

Still, not all IBM PC software will run on the Corona without modification. A few software publishers have brought out their initial offerings for the IBM PC without accurately following the Documented IBM PC Standard. One such example is the first version of Lotus 1-2-3. Running this program on the Corona requires a copy of PC-DOS. (Also, at this time an IBM PC-compatible color graphics board is required to view the graphics output of 1-2-3.) Future versions of 1-2-3 should correct this situation, as Lotus, like most manufacturers of 16-bit software, is making special efforts to ensure that its products will run on the widest possible range of 16-bit computers.

character resolution on the slightly smaller screen, the characters look a little better than those on the monitor of the desktop model.

Corona has chosen an unusual approach to dealing with the keyboard of its portable. Instead of designing a special keyboard that would act as the front cover, it has

used the same slender keyboard as the desktop model, which may be enclosed, along with a number of floppy disks, within a detachable cover. The entire unit is then transportable.

The portable is ruggedly constructed; the CRT and the disk drives are shielded from one another

by metal partitions. The molded plastic outer chassis is split horizontally, and the top portion can be removed by loosening the two screws that attach it to the front piece and the two screws that attach it to the rear panel. To gain access to the expansion slots and the memory sockets, you must remove the six

Corona PC Corona PC Portable

CPU:

Intel 8088

Memory:

128K RAM; expandable to 512K on motherboard, expandable to 1M using cards.

Disk Drives:

Two 320K 5 1/4" floppy disk drives; optional 10M hard disk.

Interfaces:

1 parallel, 1 serial.

Keyboard:

IBM PC layout.

Display:

25 lines by 80 characters
640 x 325 monochrome graphics
optional 640 x 200 16 color graphics.

Operating System:

MS-DOS, CP/M-86.

Software:

Most IBM PC software.

Price:

\$5175 — desktop
\$4925 — portable.

Distributor:

AWA
132 Arthur St.
North Sydney 2060.
Tel: (02) 922 3300.

sheet-metal screws that attach the left side cover of the internal metal chassis. While this will take much longer than with the desktop model, it can be done easily and relatively quickly.

The expansion slots in the Corona portable are arranged front-to-back as in the desktop model and are located directly over the memory sockets. The portable is also equipped with adjustable, vertical rear card supports. Slots in the plastic front piece provide efficient cooling by allowing air to be drawn into and around the expansion cards and then out the rear, past the mounting brackets.

Initially, Corona's standalone 10M-byte hard disk unit was the hard disk option but this has been replaced by a half-height 10M-byte internal drive.

The portable uses a different type of monitor with an etched antiglare screen, although it still has a P-31 phosphor. Like its larger brother, it is very readable, with 14 by 13 characters in a 16 by 13 matrix.

The portable's external dimensions are par for the course in this stage of development for full-featured transportable computers, and you should be able to take it on the plane with you — if you're persuasive. Being able to take the computer home from the office should soon convince many users to opt for the portable model. Corona also offers a nylon carry bag to make carrying the Portable PC a little easier and to provide a little additional protection.

The desktop system retails for \$5175 (128K-byte RAM, dual disk drives) including a bundled software package of MS-DOS, GW Basic, PC Tutor and MultiMate. The portable retails for \$4925 (128K-byte RAM, dual disk drives) including the same software bundle. An external 10M-byte hard disk version is available for \$4775, and an internal hard disk version costs \$4075.

Bundled software

Corona has modified MS-DOS to correspond more closely to PC-DOS.

The distribution disk that contains MS-DOS (called Corona-DOS in this case) also includes several interesting utilities that extend beyond the capabilities of MS-DOS version 1.25 (equivalent to PC-DOS 1.10). For example, the CONFIG utility can set up the computer to utilize either one or two floppy disk drives, up to four virtual disk drives on the hard disk, and a user-definable RAM disk. Normally, drives A and B are configured for floppies, C through F as virtual drives on the Winchester, and G as a RAM disk. This configuration is not mandatory, however, and CONFIG can even set up the hard disk drive as A through D. The addition of the RAM disk is a real plus, particularly with the 512K-byte memory expansion capability. However, if the RAM disk configuration is used in a 128K-byte system, MultiMate won't run, since it requires the entire 128K-bytes.

One interesting utility shows rows of memory chips on the screen and goes through a process of checking the individual chips for errors. If errors are found, the bad chip or chips and their exact position in the motherboard RAM array are graphically illustrated on the monitor.

The EQUIP utility provides a summary of system configuration. Other utilities streamline hard disk usage; some of these change the size of the hard disk partitions and back up data to floppies by date, subject, or disk partition.

Corona has also included some demonstrations of its improved graphics capabilities, an adventure game, a strategy game, and some other simple diversions. There is even a program that turns your Corona into a simplified synthesizer, although the speakers are not loud enough to take full advantage of this feature.

The PC Tutor program included with the system guides first-time users through the intricacies of using the Corona. This instructional program is particularly helpful since the documentation explaining MS-DOS and the various offered utilities, though quite complete, is printed in

small type and is difficult to wade through. In the MS-DOS documentation each command is on a separate page arranged in alphabetical order. While that order is good for referencing commands, it is not the logical order for the first-time user learning about MS-DOS.

The Corona PC user guide, on the other hand, is in bigger print and is easier and more logical to use.

For the Basic programmer, there is a separate package containing the disk and the documentation for Microsoft's GW Basic (graphics included), which will allow programmers to use Corona's improved graphics capabilities. At this time it is necessary to use an IBM PC-compatible graphics board to view IBM graphics programs on screen; however, all graphics programs written in GW Basic should be able to run without a hitch and should make full use of Corona's graphics.

The MultiMate word processor bundled with the Corona was designed to duplicate the features and ease of use of the dedicated Wang word processor. MultiMate is easy to learn and is quite powerful, with a full helping of worthwhile bells and whistles.

Sales and service

AWA uses a network of 60 dealers to market the Corona systems. Most are value-added dealers rather than storefront dealers; they use Revelation as a powerful applications development tool.

The Corona complements AWA's successful range of Sequel and Realty minicomputers that also make extensive use of the Pick operating system.

The combination of a high level of PC compatibility, the powerful applications development tool, Revelation, and a well-established Australian electronics and computer company as distributor should ensure Corona has a solid future in the PC market.

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Pick is often referred to as the fourth contender for operating system honors behind CP/M, MS-DOS and Unix. Jonathon Sisk explains how this unique operating system works.

The Pick Tutorial

A little-known operating system will soon make its debut on the PC. The Pick Operating System has been called "the best-kept secret in the industry" by Business Week magazine, and soon the secret may be out.

The micro marketplace is ready for the next generation of user-friendly operating environments. One fourth-generation system, the Pick System, combines the speed and power of a virtual memory mainframe with the simplicity and ease-of-use of a personal computer. For many applications, it is clearly superior to MS-DOS and even Unix.

Many people are baffled by the technical aspects of using a PC, or just plain frustrated trying to learn all the necessities. Many owners and potential owners want a computer that is so simple that they can concentrate on the job at hand instead of the computer.

The Pick System has long been recognised for its ability to turn these people into enthusiastic computer users. This may be just what the microcomputer manufacturers are looking for; to open the floodgates to the hundreds of thousands who want to do something on a PC without the

intermediate step of a self-inflicted technical education.

The Pick System is not a new operating system. It was first developed by Don Nelson and Dick Pick, two programmers who worked with TRW Corp of California in the late 1960s.

The English-language information storage and retrieval approach was conceived during the US Army Cheyenne Helicopter project and was first used to keep track of project activities and accounting. The system was refined into the Generalised Information Retrieval Language System (GIRLS) at the University of California at Irvine. During the late 1960s it was run on a variety of mainframes.

The system wasn't well-suited to run on top of another operating system. Using a Microdata 800 minicomputer in the early 1970s, the entire system was rewritten from scratch in microcode, as CP/M and PC-DOS are written today. Like these systems, this approach gave the Pick Operating System an unusual degree of portability.

Since 1973, Pick Systems, of Irvine, California, has made a small fortune from implementing the Pick Operating

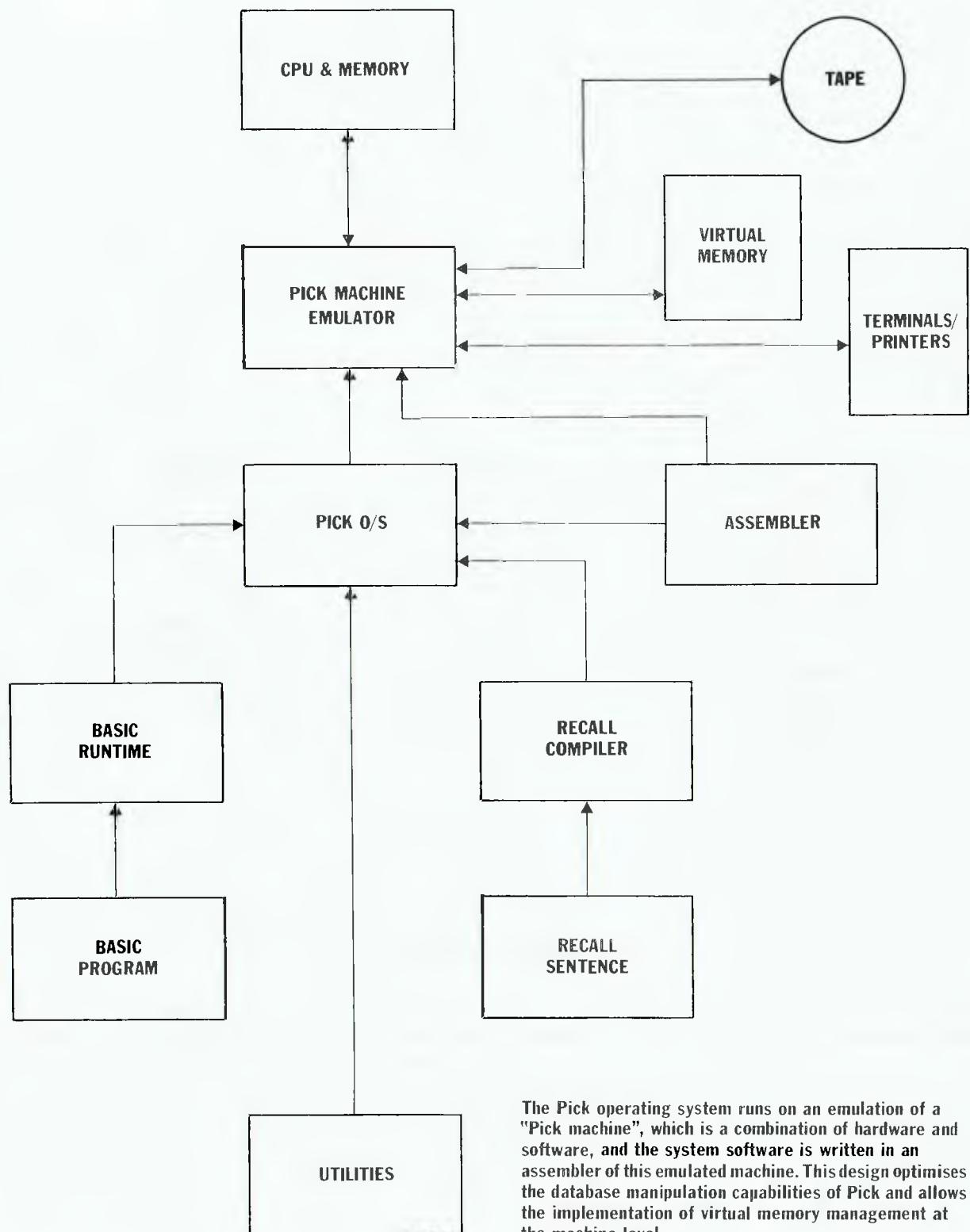
System on a variety of powerful 16-bit minicomputers. But the Pick System is to be implemented only on the PC. The PC, more than any other, according to Pick, represents a serious approach to personal computing.

Before we look more closely at his system, we'll answer the basic questions: just what is an operating system? And why does a personal computer need one?

To most of us, the term "operating system" describes an aspect of our computers we rarely use. The operating system is a program started by the computer when it is turned on. This program checks out the system, initialises all the devices, and controls them during each task.

The operating system is **very** important. This software determines the size and type of files the computer will support. It provides management of the data throughout the system, in the computer and in external storage. The operating system has a direct effect on the speed and efficiency of peripheral devices, such as disk drives.

Some operating systems will provide special functions or "utilities" to help computer programmers access and process data. Some of



The Pick operating system runs on an emulation of a "Pick machine", which is a combination of hardware and software, and the system software is written in an assembler of this emulated machine. This design optimises the database manipulation capabilities of Pick and allows the implementation of virtual memory management at the machine level.

PICK TUTORIAL

these utilities are intrinsic to the way the operating system stores the data; others are customised by the system developer to provide an extra measure of convenience to the ultimate users of the programs.

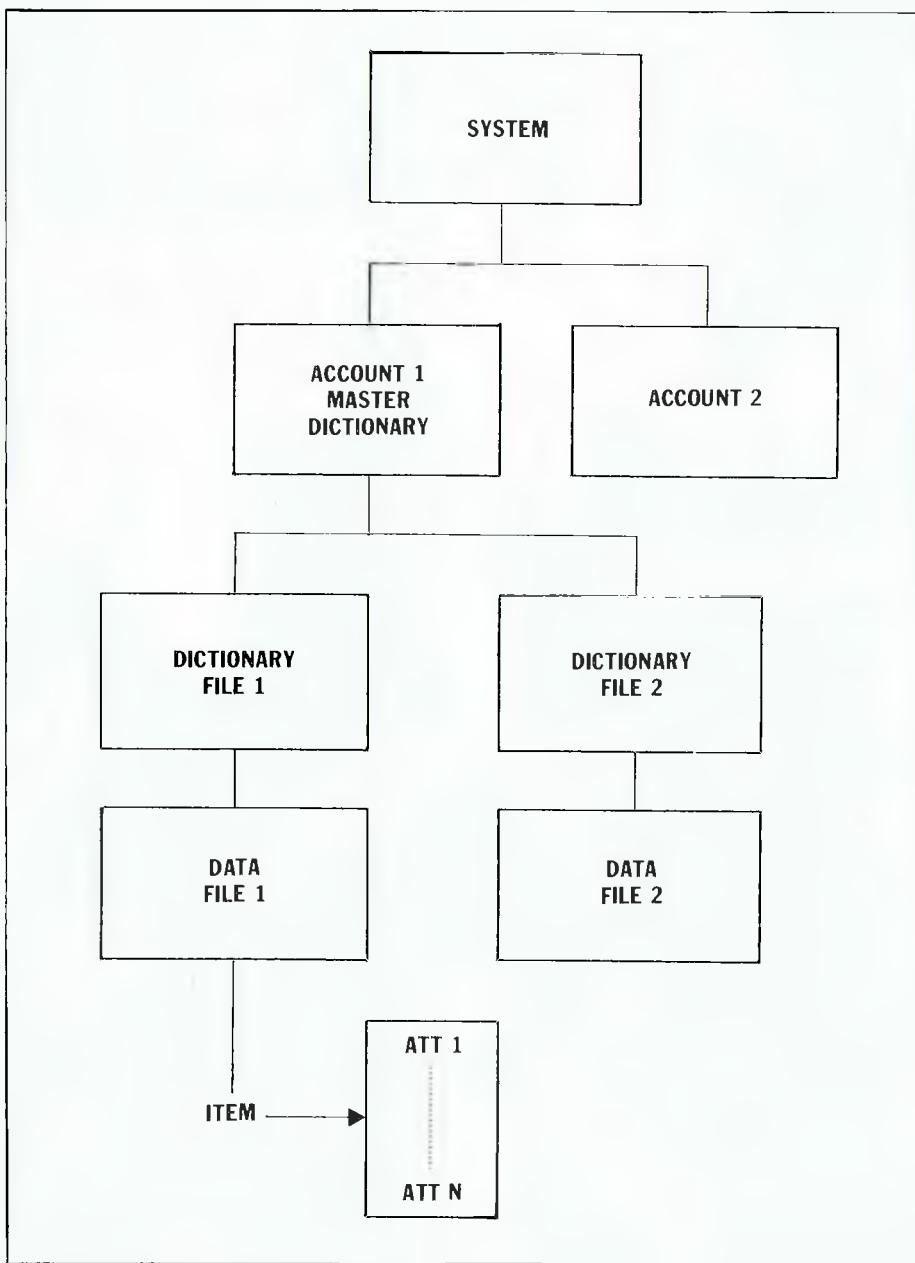
Likewise, the way in which data is handled by an operating system can make editing, formatting, and organising the data simple. Some better operating systems will even seem to reorganise the data as the user or an application program needs the information. These systems have the ability to read, rearrange, and reformat data as needed, and are often said to have database management capabilities. An operating system such as this can make the difference between an easy programming job or mechanised drudgery.

But, the fact remains that most computer users merely pass through the operating system on the way to an application program; the software's practical purpose is to locate and execute application programs. Developers use the operating system a great deal, but application users do not.

Therefore, a good operating system should be "politely transparent" to the user who is intent on doing a specific computing task with his or her computer. It should provide quick and quiet service to the application program, facilitating data processing, preserving and protecting data, and providing graceful, controlled handling of application tasks or (heaven forbid) hardware errors. In a way, an operating system must be personable to be useful on a personal computer.

The Pick Operating System provides the development programmer with a sophisticated utility-laden programming environment, while giving the computer user a politely transparent relational database.

How does the Pick Operating System do these wonderful things? By simplifying the programmer and user's environment and taking over much of the work itself. The Pick Operating System is designed as an operating environment for transportable application programs using a data



Pick Operating System file hierarchy.

structure similar to Software Arts' Data Interchange Format (DIF).

The Pick System simplifies the handling of these ASCII files by performing all data management tasks for the user and the programmer. To understand how this simplification is accomplished, we'll look into some Pick Operating System characteristics.

First, the Pick Operating System uses a virtual memory management scheme to automatically allocate and

change storage for the user. Fields, records and files are completely variable in size and format.

Virtual memory management means that all data in a Pick System is written on whatever storage is available to the system, and automatically retrieved, converted, formatted and delivered to the program or output device. More important, if the data is changed in any way, the field, record and file are dynamically expanded or contracted

and rewritten to storage, without regard to any change in the file size. In other words, the Pick System relieves the user and programmer of the data storage headaches.

The files in a Pick System are also unique. Disk space under the Pick Operating System is divided into "accounts", each with an associated set of files. These accounts are similar to the directories in the PC-DOS 2.00 tree structures, but that is where the similarity ends.

All files in the Pick System are actually two physical files. The first file is a dictionary that contains records which describe the fields within the data file. The dictionary always has one record which points to the location of the data file in memory. This dictionary/data file concept allows the operating system to access data by looking up the definition of the fields in a dictionary, locating the data file, and retrieving precisely the fields requested in the format specified in the dictionary definition.

The whole process is performed by the operating system itself at operating system speed. It is made possible by a radical departure from traditional data storage techniques.

In the Pick Operating System, the fields and records are of variable size, and can be accessed by their name. Records are not stored by numbers as they are in every other fixed-record length computer; moreover, no indexes are maintained as to the record locations.

Each record or item in a file has a unique user-assigned name. Any string of characters can be used as a record-ID, and the Pick System uses that record-ID to calculate the physical storage location of the record. The name can still be a number, like "256", but "TOM" and "JULY 25, 1983" and "FILE-RECORD-12" are all acceptable record-IDs. This means that a program doesn't need a record number to access a particular record, only the name of the record, which never changes.

Similarly, the definitions of the fields in a data file are recorded by name. These are merely records in a dictionary file, accessed and edited

like any data file. Records in a dictionary are stored by name: the name of the field that the record defines.

A field in a data file named EMPLOYEES might be called CITY. A dictionary record named CITY will be stored in the EMPLOYEES dictionary file, perhaps defining the fourth field of every record in the EMPLOYEES file, or perhaps just the first word in the fourth field of every record. A user or a program can call

A single field in a record can be called by a pre-defined name and the system can deliver an entire logical record.

for the CITY from the TOM record in the EMPLOYEES file; the system will locate the file, locate the record, locate the fourth field, retrieve the CITY, and deliver it to a user or to a program. Since the dictionary/file structure is inherent in all Pick Operating System files, the system will perform this retrieval as an operating system function at operating system speeds.

It is important to note that this dictionary concept is applied to every file in the system. A System Dictionary describes the Account Master Dictionaries, which are like directories; they point to the data dictionaries, which define and point to Data Files.

Through the virtual memory manager the Pick Operating System uses this file structure to locate and access data across directories. Because the data can be located by name, the user automatically builds a relational database every time a file is defined and records are stored.

This relational approach to data is

the key to the ease-of-use of the Pick Operating System for non-programming users. A well-constructed set of definitions in a dictionary can define a field from other files, or the results of calculations, or even translations.

Translations work like this: after retrieving a field, the dictionary definition can specify that the value retrieved is to be used as a record-ID in another file and one of the fields from the new record is to be used in place of the value originally retrieved. For example, a CITY of MEL could be automatically translated through a file of city abbreviations, and automatically output as Melbourne. The translate definition could call for the value to be further translated, through another file of city names, to Victoria, and concatenated together as Melbourne, Victoria.

The definition can even call for the target value to be further translated, or reformatted, or assembled with other fields. As a result, a single field in a Pick System record can be called by a pre-defined name, and the system can deliver an entire logical record composed of values from several unrelated files in unrelated accounts or directories . . . a true logical view of information, without regard to where the data is physically stored in the system.

Here is an example of how this works: let's say you define a file of people. Each record is composed of a name, a social security number, and a telephone number. This file is useful for sorting and selecting the people by their telephone exchange.

Next, you create a file of addresses. These records are also filed under a name, but are composed of street, city, and postcode. A third file contains records filed under the last four digits of a telephone number, with telephone type, color and location code within the building. A fourth file might contain only postcodes, with State names recorded as a field under a record-ID of postcode.

Other records in this general-purpose translation file would have record-IDs of building location codes, with translations into location

OPERATING SYSTEM

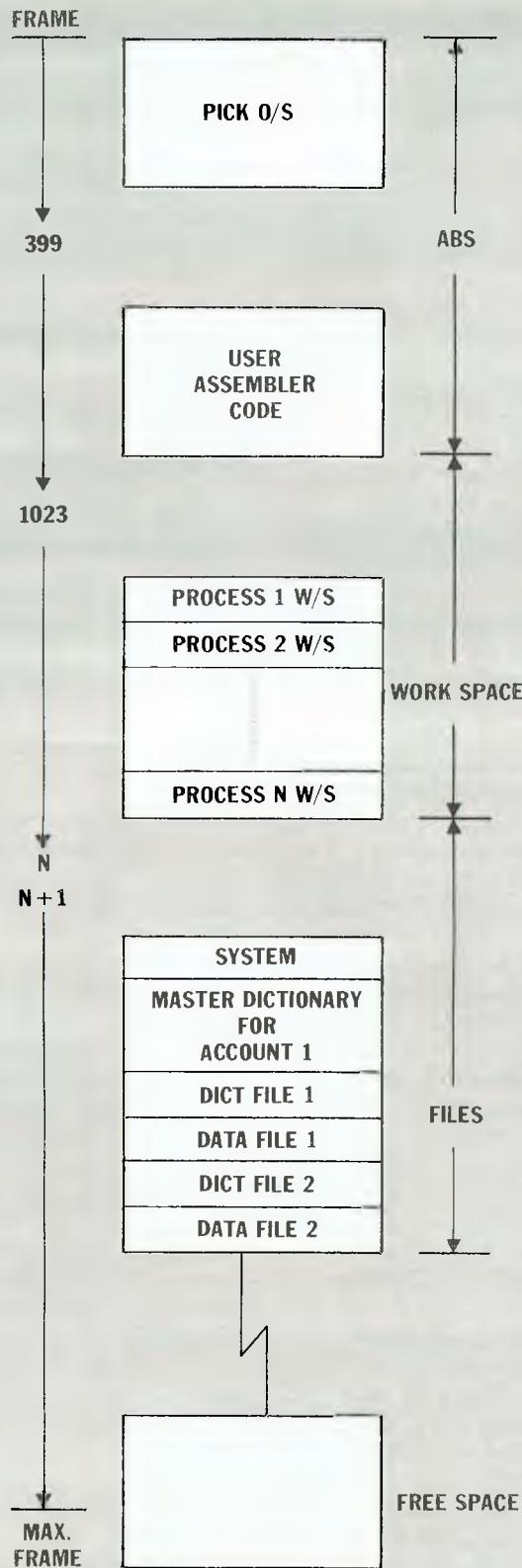
The Pick operating system was one of the first to use virtual memory management techniques, well before the idea became popular with mainframe manufacturers.

The virtual memory of a Pick system is broken down into 512K-byte blocks called "frames". The first 1024 frames are reserved for the operating system and user assembly code.

Following this section in virtual memory are the "process" workspaces. Every terminal on a Pick system requires a process workspace which is a minimum of 32 frames — the maximum size of a workspace is dependent on the implementation.

Immediately following the workspaces (or system workspace) is the "system file", and after the system file are the various accounts' master dictionaries, dictionaries, and data.

The operating system calculates the starting frame of the system file by adding the number of reserved frames to the number of workspace frames. The operating system opens the system file, and when the user attempts to logon, his account name is read from the system file. If the account exists, the master dictionary for that account is opened and the user is logged on.



LOCAL AREA NETWORK

names. Each of these files has a properly constructed dictionary, with definitions that refer to data across files.

You then might need to know all the people from a specific city and State, in order by name within the building location. You sit at your keyboard, and enter a sentence like this:

LIST THE PEOPLE WITH A CITY OF MELBOURNE DISPLAYING NAME PHONE LOCATION

A Pick Operating System utility known as ACCESS processes this sentence. It accesses the dictionaries and the files, relates the data, performs the translations and conversions, and returns a formatted list of the individuals, on the screen or on the printer, with headings, as if all the data were available in one file and one physical record.

ACCESS will also sort on any combination of sort keys, if the sentence contains the phrase BY or BY-DSND followed by a field's name. These fields can be defined as simple values, or can be defined with translations, conversions, reformatting, or any combination.

Finally, the ACCESS system also processes a SELECT sentence; here the system either selects or selects and sorts, and sets up a temporary file for the records selected, submitting them to an application program one at a time.

The Pick Operating System has a full complement of built-in utilities to take advantage of the dictionary/data file structure. First, a built-in line Editor can locate and modify any record in any file in the system, including the system dictionary, any file dictionary, or any data file.

Next is the ACCESS utility. This is an English language retrieval and output utility. Through the use of a simple sentence, such as:

SORT THE EMPLOYEES WITH A CITY OF MELBOURNE BY NAME

The Pick Operating System will locate the EMPLOYEES file, select all the records with a CITY field which matches MELBOURNE, sort and format a report on the screen,

set up a heading, label the columns, and list the records or save the list for subsequent processing. Two similarly powerful utilities are the RUNOFF word processor and the JET text editor.

But the most powerful feature of the Pick Operating System is the Pick/Basic language, which incorporates the database access and retrieval capabilities into the command set. The operating system provides automatic compilation and link-editing of Basic programs, along with an integrated macro assembler.

Many Pick System utilities are activated in direct communication with the system, similar to PC-DOS, at a X prompt. The system supports a wide range of verbs, called the Terminal Control Language (TCL). The user can create new customised verbs, combining other TCL verbs, assembly language routines, or even programs, in a PROC.

These PROCs are similar to PC-DOS batch files, and they reside with the TCL verbs. They are executed whenever the name of the PROC is keyed or passed to TCL.

This article has been a fairly brief description of some features of the Pick Operating System. In combination, these features can be useful when applied to practical business and personal computing. The natural data structure is similar to the way most people think of sets of information.

When combined with an English-language interface and the ability to write complex batch files, the system lets users talk in a natural or even a personally customised language. The not-so-simple result is a personal computing environment in which users can concentrate on the data and the objective to be accomplished, instead of how to get the computer to do it.

PC

Jonathon Sisk is President of JES & Associates Inc, a California consulting company specialising in Pick Systems. Diagrams by David Rose, a technical specialist with Ultimate Computers, Australia.

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Revelation is an emulation of the Pick operating system for the PC. Pushed aggressively by AWA for the Corona PC, and with a growing band of enthusiastic users, Pick is coming of age. Neville Angove investigates.

REVELATION: Pick Power for the PC

Relational database design has been a trendy topic for some years among mainframe and minicomputer programmers as well as a slew of academics. But the amount of effort needed to develop a workable true relational database has long been considered too great to be cost-effective on a personal computer.

The arrival of the Pick operating system changed all that.

Pick allows fast and (comparatively) effortless development of a true relational database system largely because it is designed specifically for this task. More important, because it was designed to run on the mini-computers of 10 years ago, today's personal computer has enough capacity to run at least a subset of it.

But Pick is not easy to transport to a new machine, and the alternative to this is to emulate Pick — just as Digital Research's Concurrent DOS emulates PC-DOS — and run it as a program under PC-DOS. The first such emulation of Pick for the PC and

PC-compatibles is Revelation.

The first thing you notice about Revelation is that not only is it not a true operating system, but it does not even emulate an operating system. It turns the PC into a database machine while still allowing you access to PC-DOS for running non-Revelation applications software (in fact, you can use Revelation to create a menu system for running all those expensive programs that do not seem to do all that their designers claimed).

Revelation is actually four major parts plus assorted utilities: a terminal control language (TCL); R/List, basically a List command with options used to display the database; R/Design, a menu-driven package used to define database records and fields and data input/update/retrieval screens; and R/Basic, a programming language used by R/Design and the means for a user to create customised screens, reports, displays and even databases beyond the limits of R/Design.

The terminal control language is similar to a job control language, and sits at the front of Revelation with its

highly unmeaningful ":" prompt. It is composed of 40 verbs (plus any the user cares to create) and their modifiers, and is really only used to call up built-in functions such as the line editor and R/Basic compiler, or access R/List and R/Design R/List.

R/List is really just a listing command with a great many options used to display an existing database, either from the terminal or through a program. For example, the command

**LIST CUSTOMERS NAME ADDRESS
TELEPHONE BALANCE**

will extract from the customers file the information in the defined fields of name, address, telephone and balance. Each field specified can be qualified: list names containing only certain character strings, or balances in a specified range, or sorted by address.

The List command can define headings and footings, can send the output to a printer or save it for further manipulation, can join information from two or more files, and can be saved under a given name for future execution. Since Revelation

REVELATION

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displayed
immediately before
logging-on is
attempted.**

E474

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12:25:89 17 JUN 1984

YOUR ACCOUNT PLEASE:

**Basic set of
Revelation
commands which
can be added to
by the user.**

COMMAND	COMMANDS	12:26:11 17 JUN 1984
1. ATTACH	18. FORM-LIST	35. SORT
2. BASIC	19. GET-LIST	36. SELECT
3. LIST	20. LIST	37. SUM
4. CATALOG	21. LISTFILES	38. TERMINAL
5. CHANGE-PASSWORD	22. LISTMEDIA	39. TIME
6. CLEAR-FILE	23. LOOKDICT	40. WHO
7. COMPILE	24. NAMEMEDIA	
8. COPY	25. RENAME-FILE	
9. COUNT	26. RDESIGN	
10. CREATE-ACCOUNT	27. RUN	
11. CREATE-FILE	28. SAVE-LIST	
12. DELETE	29. SELECT	
13. DELETE-ACCOUNT	30. SET-CRT	
14. DELETE-FILE	31. SET-FILE	
15. DELETE-LIST	32. SET-LPR	
16. DETACH	33. SET-OPTIONS	
17. EDIT	34. SET-PORT	

Results of search through the tutorial database using R/List, after specifying address details required.

PAGE 1		12:28:37 17 JUN 1984	
CUST.	COMPANY	ADDRESS.....	CITY..... SI. ZIP...
932	VISICORP	WHATIF DR	SOMEWHERE XX 00000
621	FORD	P.O. BOX V8	EVERYWHERE XX 00000
378	MICROSOFT	10700 NORTHRUP	WA 98004
622	EXXON	123 WILDCAT DR	EVERYTOWN CA 95009
111	IBM	P.O. BOX 1328	BOCA RATON FL 33432
101	COSMOS	P.O. BOX AH	MORTON WA 98356

stores the last nine commands given through the TCL, any recently given command can be repeated, and a complicated command can be edited using the line editor.

At first glance, R/List seems little different from the terminal commands of dBase II or Dataflex, but it is essentially a simplified data query language, including the ability found in some DQLs to create new data structures.

The major component of Revelation is a non-programmer's delight: R/Design, a menu-driven package that is used to define database records and fields, data input/update/retrieval screens, reports (using R/List commands), and menus. The R/Design menu prompts the user through the steps needed to define files, records and fields (including links and cross-referencing), controls the design of data entry/update screens and report formats, and automatically calls the various commands used to modify the data dictionary, and then writes the source code. The procedure is completely menu-driven (but can be command-driven by the user), and allows back-tracking at any stage without destroying what has been previously defined.

A major advantage of R/Design is that the source code generated can be customised by the user to add facilities that are either not supported by R/Design or are too difficult to define using any of R/Design's commands.

The last major part of Revelation is R/Basic, the language used by R/Design and the means for a user to create customised screens, reports, displays and even databases that cannot be done easily through the other parts of Revelation. R/Basic looks similar to Microsoft Basic, but incorporates elements of Fortran, Cobol and Pascal. It is a powerful language, not really suitable for any except experienced programmers, but allows the development of data structures and data management systems second to none in power, flexibility and usefulness.

```

Top
.P
001 * PROGRAM -- SCAN - G.K.5-5-80.
002 * PROGRAM TO SCAN FILE ITEMS A SPECIFIC CHARACTER STRING.
003 PROMPT "";AM=CHAR(254);TOF=CHAR(12)
004 OPEN ',',MD' TO MD ELSE PRINT "MD NOT FOUND ?";GO 999
005 100 PRINT;PRINT
006 PRINT "ENTER FILE NAME TO SCAN : ";INPUT FN:
007 IF FN="" THEN GO 999
008 OPEN "",FN TO FILENAME ELSE PRINT;PRINT "FILE NOT FOUND ?";GO 100
009 PRINT;PRINT "EXCLUDE OBJECT CODE ITEMS (Y/N) ? ";INPUT EXCL,1:
010 PRINT;PRINT "PRESELECTED ITEM LIST (Y/N) ? ";INPUT PRESEL,1:
011 PRINT;PRINT "ENTER SUBSTRING TO SEARCH FOR ";INPUT SUBSTR
012 IF SUBSTR="" THEN GO 100
013 PRINT;PRINT "PRINTER OUTPUT (Y/N) ? ";INPUT PRT,1:
014 PRINT;PRINT "CONTINUE (Y/N) ? ";INPUT ANS,1
015 IF ANS="N" THEN GO 999
016 PRINT;PRINT "NOW SCANNING ':FN: FILE ...."
017 IF PRT="Y" THEN PRINTER ON ; PRINT TOF
018 IF PRESEL="Y" THEN GO 500
019 SELECT FILENAME
020 SCANLIST=""
021 500 READNEXT FNID ELSE GO 900
022 IF FNID[1,1]="$" AND EXCL="Y" THEN GO 500
021 500 READNEXT FNID ELSE GO 900
022 IF FNID[1,1]="$" AND EXCL="Y" THEN GO 500
023 READ REC FROM FILENAME,FNID ELSE PRINT "ITEM ':FNID:' NOT FOUND. ";GO 500
024 IF INDEX(REC,SUBSTR,1) THEN NULL ELSE GO 500
025 PRINT;PRINT "FILE ':FN:' ITEM ':FNID:' -- SUBSTRING ':SUBSTR:' LINES."
;PRINT
026 SCANLIST=SCANLIST:FNID:AM
027 FOR ATTR=1 TO 9999
028 LINE=EXTRACT(REC,ATTR,0,0)
029 IF LINE="" THEN GO 600
030 IF INDEX(LINE,SUBSTR,1) THEN PRINT "<":ATTR "R#4":> ":LINE
031 NEXT ATTR
032 600 IF PRT="Y" THEN GO 700
033 PRINT;PRINT "CR FOR NEXT OR END ... ";INPUT ANS,3
034 IF ANS="" THEN GO 700 ELSE GO 900
035 700 PRINT;GO 500
036 900 PRINT;PRINT "FILE SCAN COMPLETE ..."
037 WRITE SCANLIST ON MD,"SCANLIST"
038 PRINTER OFF
039 GO 100
040 999 PRINT;PRINT "SCAN TERMINATED. ";STOP
041 END
EoR

```

R/Basic code to search file for a specific character string. While the format is similar to Basic, many of the commands are not.

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PICKING ANOTHER PICK

Revelation is not the only version of Pick running on the PC. Australian Associated Systems Developers is testing a Pick emulator developed by CDI Information Systems, of the US. This emulator also runs under MS-DOS (Version 2 or better). Released as CDI-100, it should be available in Australia from July 31.

CDI-100 differs from the present release of Revelation in several respects. It mimics the CDI-1000 package that runs on the IBM Series/1 minicomputer (a "purer" version of Pick), and the developers claim that code and data files from CDI-1000 or another Pick implementation will run on a PC using CDI-100, as long as the files are small enough to fit on the PC.

CDI-100 will also run under Unix

on the PC, allowing multi-user and multi-terminal operation. Like the new release of Revelation, CDI-100 doesn't need the 8087 coprocessor, although it will run faster if the 8087 chip is installed.

The front-end of CDI-100 is claimed to be more user-friendly than that of Revelation. It incorporates a dynamic menu system and extra Help features. The manual is also more comprehensive. Facilities to help applications programmers, including access to the system's foundation and a comprehensive programmer's reference guide, are also provided with CDI-100.

CDI-100 also supports full data file transfer and access between MS-DOS-type files and Pick-type files.

For users who would rather not run a Pick emulation under MS-DOS or Unix, two versions of Pick as PC operating systems will be released soon. The first is from Dick Pick himself and will be available through all Pick resellers by the end of this year. The second, from Ultimate Computers,

is claimed to be significantly more enhanced than Pick's version. Although both can be used on a partitioned XT drive (so you do not lose access to PC-DOS or CP/M-86), neither incorporates a way of transferring files between operating systems.

The only difficulty with using Pick as the only operating system on the PC is that you will have to wait for a developer to release word processing and spreadsheet programs that will run under Pick. While these have made it onto minicomputers running Pick, it may be quite some time before they are available on PC running Pick.

Australian Associated Systems Developers Pty Ltd,
Data Place, 139 1/2 Regent St,
Chippendale, NSW 2008.
Tel: (02) 699 9155.

Ultimate Computers Pty Ltd,
10 Bridge St, Pymble, NSW 2073.
Tel: (02) 449 3888.

The utilities included with Revelation allow the transfer of files to and from a Pick type minicomputer (including controlling the modem used for the transfer) and the conversion of Pick PROC files to Revelation R/Basic, and conversion of dBBase II data files to Revelation format. One utility is used to create a 64K-byte parallel printer buffer, and another enlarges the PC's keyboard buffer to 256 bytes.

The operation of Revelation revolves around the concepts of accounts and dictionaries. The account is a holdover from the multi-user origins of Pick, but necessary to maintain compatibility with other Pick implementations. An account is a collection of databases which can be

linked together, are subject to the same set of user-defined operations, can use the same field/record/file definitions, and are logically separated from all other databases. An account also can be password-protected if necessary.

The concept of a Revelation dictionary is harder to grasp. It is basically a database data dictionary that fully describes each file, record and field in an account. It also allows multiple descriptions of the same field (similar to using multiple Picture clauses in Cobol), cross-referencing of fields, calculations and translations of field contents, and incorporates descriptions of the fields as well. Modifications to the structure of a field, file or record are made by

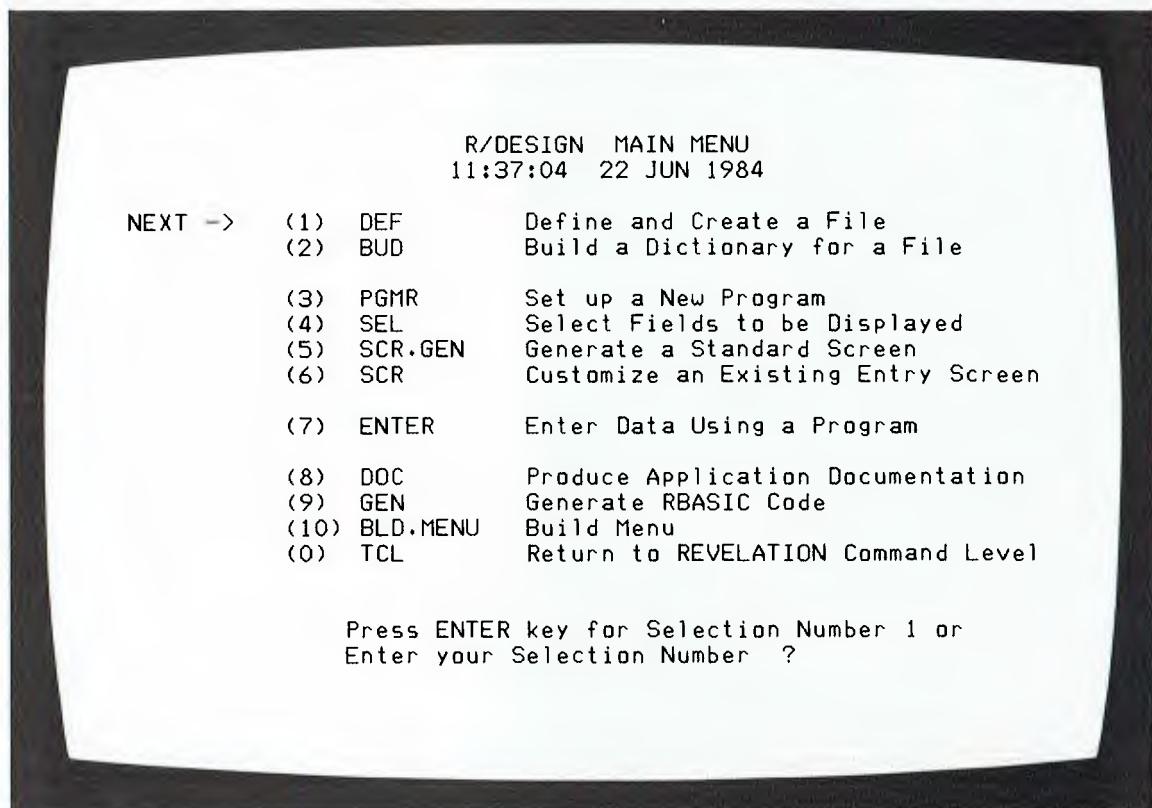
changing the dictionary definitions, with the actual data in the file left untouched.

Somewhat related in concept to the dictionary is the vocabulary. This is initially a file of standard commands associated with an account, but a user can create his/her commands and store them in the account's vocabulary. For example, a complex and frequently used R/List statement can be replaced by a short mnemonic. Even an R/Basic program can be handled this way.

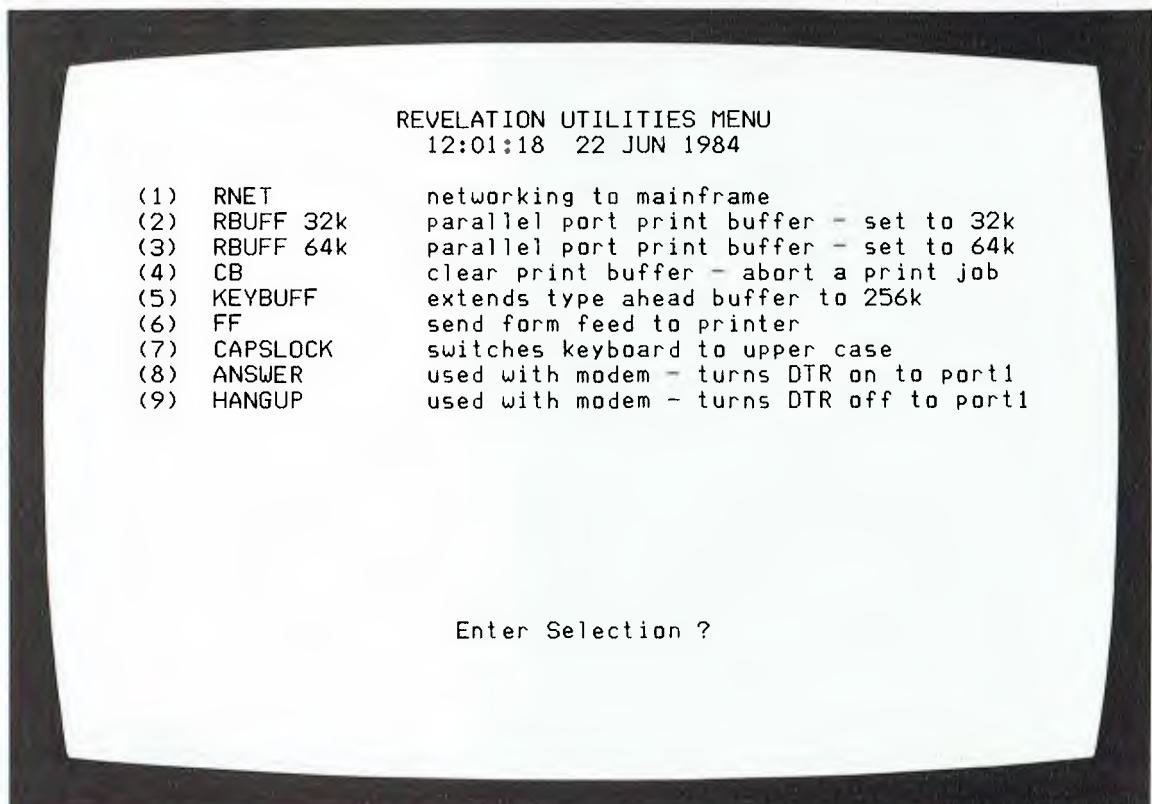
The primary data structure created by Revelation is basically an indexed-sequential file with a single or multi-part key. There are no limits to the number of files that can be used; in fact, the concept of a file being "open"

REVELATION

R/DESIGN main menu, listing the steps taken to build a database application. As each step is completed, R/DESIGN automatically moves onto the next.



A menu of some Revelation utilities, built with the BUD.MENU utility.



is irrelevant to Revelation since all files in an account are accessible by R/List or R/Design.

Revelation has only two limitations: the maximum record size is 64K-bytes (which means the maximum field size is also 64K-bytes), and only one key — although it may be multi-part — per file is allowed. In practice, the first limitation is irrelevant except in the most peculiar of situations. And the second can be overcome by creating a cross-referenced file or inverted file that will act as a second key.

The ability to link together as many files as needed is a feature of a true relational database, and gives Revelation an advantage over other personal computer data management systems. The fact that the data dictionary allows an inverted file to be created without requiring all the file's fields to be duplicated to the new structure (a feature not found on many mainframe database systems), coupled with the automatic data compaction (fields can be any length, but only space actually filled with data is stored) means a significant reduction in storage needs.

Two features of Revelation are especially important to programmers dealing with real world applications rather than textbook ideals. The first feature is that additional fields can be added to a file simply by adding their definitions to the dictionary. The file itself is left untouched, and a listing of records inserted before the changes show only blank space where the new fields' data would be if the data had been included at the file's creation.

The reverse effect applies if fields are deleted from a file. Although the data is still in the file, it can no longer be accessed, and blank fields will not be inserted in new records added after the modification. This means that any changes to a database's structure after it has been in use do not require that the files be copied to their new structures (unless you are desperately short of space).

The second feature is the use of multi-value fields. If, for example, an employee needs to have details of

PROGRAMMERS FALL IN LOVE

Programmers who use Pick in any of its various incarnations will argue that once you have tried it, you won't return to either a programming language or a so-called fourth generation language. The history of Pick abounds in anecdotes about programmers who, after being attracted away from Pick by higher salaries offered elsewhere, quickly returned after discovering that nothing else was as satisfying to use as Pick.

Why do programmers like Pick? The typical answer given by programmers is that it is an easy operating system to use. Although the value of a particular Pick implementation may be enhanced by any additional utilities the designer provides (word processors, spreadsheets, and code generators, for example, vary from one Pick implementation to the next), the core of Pick remains the same because it was designed to be a transportable operating system with transportable applications. It is this unchanging core that infatuates Pick programmers.

Pick is basically an operating system with built-in database facilities. Defining your data dictionary, for example, automatically creates the record and file structures in Pick. You can modify the data dictionary — add new fields, for example — even after you have started entering into the database. In any other database system, this at least

requires copying the old file's data into the new structure. But in Pick, the act of adding the new dictionary entry changes the file structure automatically (as far as the user is concerned).

Programmers who are used to facing time-consuming restructuring of databases to handle minor changes in a record's structure can understand the value of such a feature.

If complex programming is required for a particular application, Pick has its own programming language that answers a programmer's wildest dream. It incorporates the best features of several languages. Although it is called Basic, it also contains elements of Pascal, Fortran and Cobol. It bears only a superficial resemblance to the original Dartmouth product.

Pick Basic has few restrictions. One programmer said it had "magic debugging facilities", which allowed debugging to source code level. Because it is semi-compiled in use, it is fast. Because its operating system routines are only called into memory when needed, the source code is compact. Programs can be prototyped and run, then modified extensively in operation without extensive code changes.

Programmers also like Pick because code written for one Pick implementation will run virtually unchanged on any other (although the code may need to be recompiled). Even "impure" versions such as Revelation use a command set that is almost identical to Pick's Pick.

several children associated with his other particulars, they can be inserted in the one file without duplicating all the other details in the record. A second linked file for dependents — the usual way of

handling this problem — does not have to be created.

In spite of its excellent value as a relational database management system — and Revelation's features put it in an entirely different class than

all the other database management packages for the PC — it is slow. In spite of the mandatory use of the 8087 coprocessor, sorting and copying files take about 50 per cent longer than dBase II (and probably much longer than dBase III), and compiling R/Basic code can take as much as two minutes per line according to the manual.

Other negatives include a front end that will frighten most non-programmers in spite of its forgiving nature, and a manual that is often too terse to be helpful. If Revelation could accept data files from other packages apart from dBase II, all would be forgiven, but this facility is not included in the current release (version D). Finally, Revelation does not like lower case letters input from the keyboard.

Revelation is not really meant to be marketed to the inexperienced. For example, AWA sells it on the Corona, but generally through value-added dealers who actually write (or teach the user how to write) the applications required. For experienced programmers, or those users determined to take the plunge, all the distributors run telephone hotline services.

On the balance, though, Revelation is by far the preferred package for any PC user who is serious about creating a usable relational database and the menu systems need to run it. Version E, due for release in Australia soon, promises higher speeds in some areas, additional utilities, and has the use of the 8087 coprocessor as an option rather than being mandatory.

PC

FMC	NAME	FORM, CONV	JUST	FMC	NAME	FORM, CONV	JUST
	ACRT			9	INVOICE.DATE	D2-	L 8
	BLPTR			10	CONTACTS		L 10
	STATS			11	COMMENTS		T 40
0	CUST.NO		L 7	12	STATUS		L 2
0	AD1		L 5				
	DICT						
	ALL						
0	LENGTH	QANS=LEN((RECO R 8					
	DEBITS	QANS = SUM((IN R 10					
	PH	QANS=RECORD<6 R 14					
	STATUS.DESC	HOLD=XLATE(("CU L 10					
0	RECORD	QANS=RECORD 1 L 42					
1	COMPANY		L 10				
2	ADDRESS		L 15				
3	CITY		L 14				
4	ST		L 3				
5	ZIP		R 6				
6	PHONE		R 12				
7	INVOICE.NO		L 10				
8	INVOICE.AMOUNT	MD2.	R 10				

The result of the **LOOKDICT CUSTOMERS** command, displaying some details of the fields in a record.

PAGE 1				12:53:37 22 JUN 1984
C..... COMPANY... ADDRESS..... PHONE..... INV.AMT... INV.DT..				
932	VISICORP	WHATIF DR	200-987-6543	83.92 08-29-82
621	FORD	P.O. BOX V8	300-111-1111	850.23 08-04-83
				101.00 04-12-82
				50.10 01-08-83
				7,654.22 11-15-83
				-50.10 12-21-83
378	MICROSOFT	10700 NORTHRUP	206-641-8080	30,958.31 01-01-84
622	EXXON	123 WILDCAT DR	100-123-4567	756.52 12-18-81
111	IBM	P.O. BOX 1328	800-447-4700	984.72 08-17-82
				2.34 10-11-82
				45,098.32 08-02-83
				364.52 03-23-84
				9,876.32 04-21-84
				65,523.98 06-05-84

6 record(s) listed.

:

Details extracted from the CUSTOMER data file, showing multi-value fields for invoice amounts.

Revelation Version E

Picksoft Pty Ltd,
Suite 5, 20 Stuart St,
Collaroy, NSW 2097

Tel: (02) 982 8553.

Price: \$1730 (includes 8087 coprocessor)

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Also distributed by AWA Data Processing, North Sydney, and Ultimate Computers, Pymble NSW.

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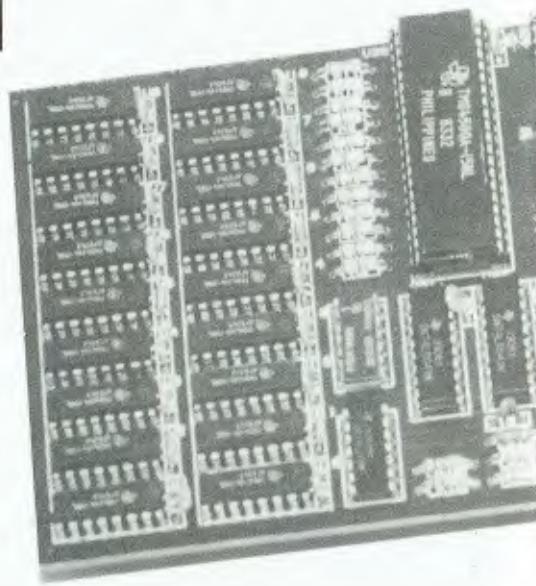
BANKCARD NO. 496

Expires Signature

Jim Withnall wanted to develop a micro-mainframe link that would support a true distributed processing environment. Graeme Greenhill of Topology Networking describes the evolution of the Topnet board from Withnall's kitchen table to the production line.

THE MICRO-MAINFRAM CONNECTION

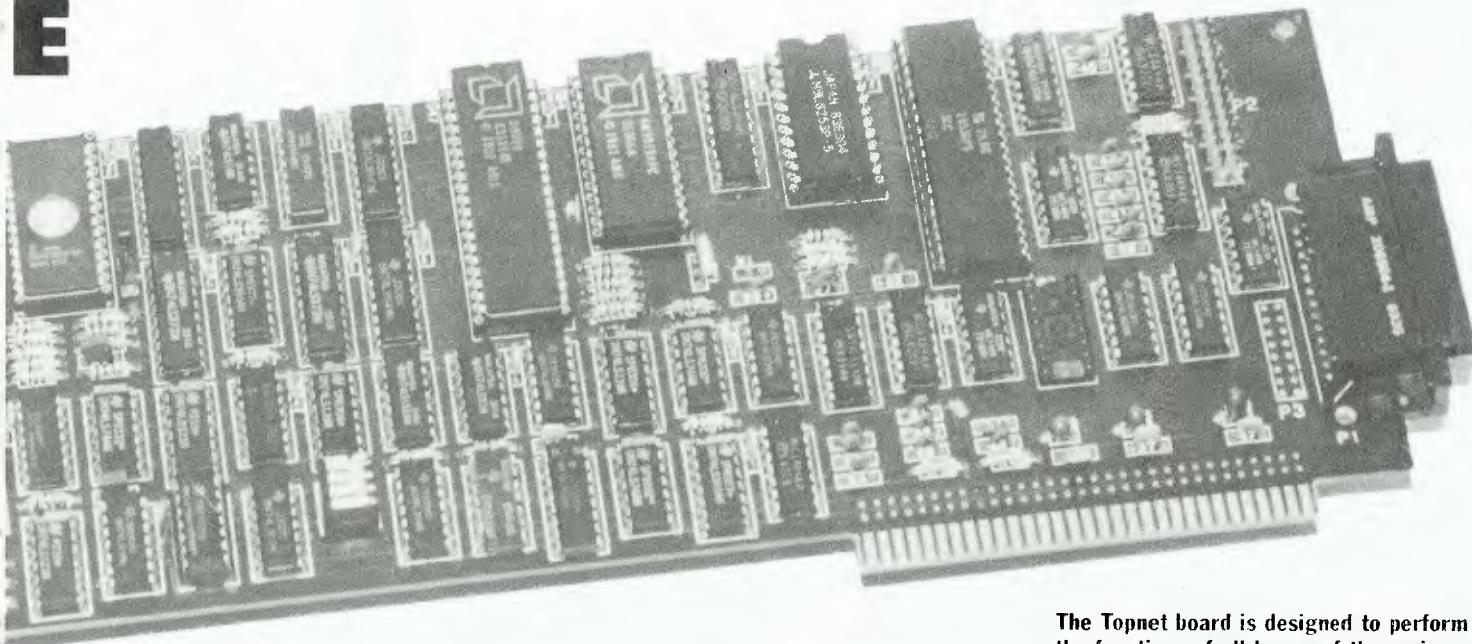
AN AUSTRALIAN SOLUTION



Topology Networking Pty Ltd recently announced the Topnet Networking Modules, a family of hardware and software products designed to handle a wide range of communications requirements for microcomputers in mainframe-based networks.

The cornerstone of the Topnet Modules is the Topnet Board, an intelligent communications controller that runs as an expansion board in a PC. An optional integrated synchronous modem, and a series of software modules encompassing SNA/SDLC and BSC communications for both interactive use and batch file transfer operations are offered with the board.

With its own 8088 microprocessor, 128K-bytes of RAM, real-time clock and two serial ports, the Topnet Board effectively doubles the PC's power by running its own software



The Topnet board is designed to perform the functions of all layers of the various IBM protocols by using interchangeable hardware modules.

independently of the PC's main processor. Thus, for example, a user can take a few seconds to schedule a number of files to be transmitted to or from the host, and then continue with other unrelated processing while the Topnet Board handles all communications.

Perhaps more significantly, the co-processor concept allows the Topnet Board to maintain a communications session in background, regardless of the application running on the PC. Other communications products, including those from IBM, require the session to be terminated before any other application can be started, which in many cases causes significant problems for network managers.

The Topnet modem, a Telecom Australia-compatible 1200 bit/sec synchronous modem with auto-dial, auto-answer and auto-disconnect

capabilities, attaches directly to the Topnet Board inside the PC. It can also be used in leased-line networks.

The auto-dial modem relieves the operator of the task of establishing a communications connection, resulting in time savings in both training and operation. It also allows unattended data transmission to occur after business hours.

The modular design of the Topnet software allows each system to be configured for the particular communications environment, with as much or as little functional capability as is required. An SNA or BSC transport layer running on the Topnet Board can be coupled with a 3270 interactive terminal emulator, a 3770 or 3780 RJE terminal emulator, a file transfer facility, and/or an application interface module.

Another feature of Topnet, the application interface module, allows a

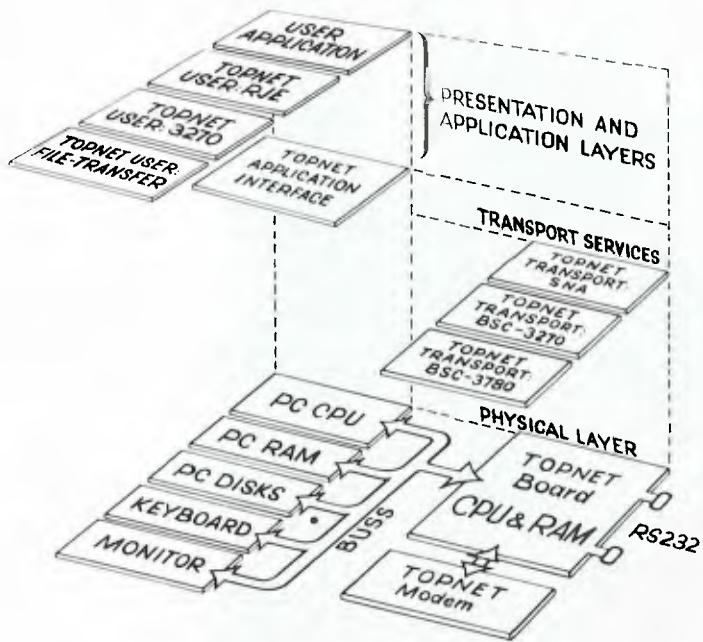
user to integrate the background communications functions of the Topnet Board with a particular application that requires some processing on the PC in conjunction with communications with a remote system. The user program simply passes blocks of data to and from the Topnet transport layer. With the application interface module, Topnet allows the PC to be used as a distributed processing device.

Like many Australian high-tech products, Topnet began as an idea long before any similar product had been announced anywhere in the world, but during the long development period enforced by limited funds, several competing products have emerged. In this case, however, the competition has almost guaranteed Topnet's success.

As well as creating a viable market for add-on communications products

TOPOLOGY

IBM uses a number of differently-structured multi-layer communications protocols, in contrast to the single model recommended by the International Standards Organisation.



for PCs, the others have done much to educate dealers and potential users about the features to look for in a SNA product (in most cases by each omitting at least one of these features). With the exception of the Irma board, which does not compete directly with Topnet, none has emerged as a market leader. It may help to look at the evolution of the PC communications market and the design and development of the Topnet modules to understand this situation.

The first (and still most common) method of communicating between PCs was using an asynchronous link with little or no error checking and rarely any error recovery procedure. While this is often acceptable for transferring text, where the occasional error causes no serious problems, accuracy is much more critical when it comes to transmitting accounting information.

Mainframe companies—and IBM in particular—recognised this problem almost 20 years ago, and introduced synchronous communications protocols with sophisticated error-checking and recovery procedures. By far the most successful of these were the IBM binary synchronous

communications protocols (bisync or BSC); 3780 for batch communications and 3270 for interactive terminals.

The 3780 has since become the most widely used synchronous protocol for file transfer between non-IBM systems of all types and sizes. A program called BIS-3780 developed by Micro-Integration Inc was one of the first and most successful programs available for synchronous micro-to-mainframe communications. This was followed by BIS-3270 which allowed a PC to function as an IBM 3270 interactive terminal and control unit.

Long before the first Apple II introduced the era of the microcomputer, however, IBM had acknowledged the limitations of its BSC protocol by spending millions of dollars on developing a radically new communications technology. Its Systems Network Architecture (SNA), which employed a new communications protocol named Synchronous Data Link Control (SDLC), was designed to handle all the communications needs of a distributed data processing (DDP) network.

The introduction of SNA/SDLC 10 years ago was seen by most observers

as IBM's first acknowledgement that there is intelligence outside the mainframe. Until then, DDP had been the exclusive domain of a handful of new computer companies whose minicomputers could offer considerable processing power at remote sites, coupled with the ability to communicate with IBM mainframes emulating IBM terminals.

It should have been no surprise then that when IBM introduced the PC it was announced that the machine would support SNA and async, but not BSC communications. (The reality, though, was that there were still a large number of bisync networks in the US, and IBM later adopted Micro-Integration's software as its bisync offering for the PC.) The two SNA programs, one emulating an IBM 3770 terminal for batch communications and one emulating an IBM 3270 interactive terminal and control unit, would both require a rather expensive SDLC expansion board.

It was at this stage that Topology Networking founder Jim Withnall started thinking about the potential of the PC to be used as a true distributed processing device. Withnall had spent many years as a senior systems programmer, systems

engineer, and communications expert with companies like IBM, Myer and ACI Computer Services before establishing his own consultancy. He had extensive experience with data communications networks, and understood the idiosyncrasies of most IBM operating systems and communications subsystems.

Because of the difference in the relative sizes of decentralised organisations, minicomputer-based DDP networks had been much less cost effective in Australia than they were in the US. But Withnall was convinced that the basic concept of DDP could be as successful in this country, given appropriate hardware and software. In terms of price, processing power, expandability, and general market acceptance, the PC had the potential, but its communications had some major limitations.

The most significant of these was a problem common to all micro-based terminal emulators available at the time. The IBM communications subsystems were all designed on the assumption that terminals would maintain a continuous dialogue with the mainframe even when there was nothing to send or receive. For a PC, though, this "handshaking" was possible only while the terminal emulation software was running.

Thus, when the user wanted to do some processing on the PC, the communications link had to be terminated. For distributed processing applications that combine local processing with mainframe communications, this situation is unworkable.

Withnall reasoned that he could solve this problem by running the communications software on a separate processor that would have its own memory and serial I/O ports. What's more, he knew he could produce a suitable expansion board for the PC with the processor and memory for less than the cost of IBM's SDLC card. Having recently completed development of a minicomputer-based SNA product and a micro-based BSC package, he had the knowledge and skills needed to develop the necessary software.

The first prototype expansion board was produced in Withnall's kitchen between consulting contracts. With a Z80 microprocessor (Z80-S10), and 64K-bytes of RAM, it was sufficient to prove the concept was feasible. But to handle a full implementation of SNA, including multiple logical units, it would be necessary to switch to the 16-bit Intel 8088 processor with 128K-bytes of RAM and the 8530 serial I/O chip.

The product he envisaged would

The first prototype board was produced in Withnall's kitchen between consulting contracts . . . It was sufficient to prove the concept was feasible.

not be a single function terminal emulator, but a modular approach to the layered structure of the Systems Network Architecture. The transport layer, which handles the communications protocol and all of the basic functions needed to maintain a session with a remote system, would run entirely on the expansion board in background.

Presentation services and application layers for such things as remote job entry, file transfer or interactive terminal emulation (such as 3270) would be provided in separate modules with a clearly defined interface to the transport layer.

By early last year, more PC communications products had begun to appear on the market, but only one offered any solution to the limitations of the earlier software products. The Irma board solved the problem of maintaining a communications session in background by providing a link via coaxial cable from a PC to an IBM 3274 control unit, instead of emulating the 3274 as the earlier

products had done.

This innovation allowed the real 3274 to maintain the communications session and resulted in wide acceptance for the Irma board, evidenced both by sales volume and the number of imitators it spawned. In situations where there is already a 3274 installed and only 3278 interactive terminal emulation is required, it is a logical choice. But the 3274 control unit is too expensive to install simply for PC communications and there are many more functions of SNA than simply 3278 emulation.

By June last year, Withnall had already spent considerable time, effort and money developing the Topnet Modules when he realised the project was too important to be carried out on a part-time basis. He commissioned a market research study that showed both a significant demand for the Topnet product and severe limitations of competing products. But the study showed that the product would have to be on the market by early this year.

So late last year, Withnall and two partners formed Topology Networking Pty Ltd with financing from the Victorian Economic Development Corp. The partners were invited to participate on the strength of their software development experience and marketing and management expertise respectively. With an aggregate of more than 30 years of computer industry experience, all three principals have spent most of their careers in the field of data communications.

Initial response from PC dealers to the Topnet product has been favorable, confirming the market research findings. With assistance from the Department of Trade, Topology is already making moves toward tapping the US export market.

PC

Graeme Greenhill is general manager of Topology Networking Pty Ltd.

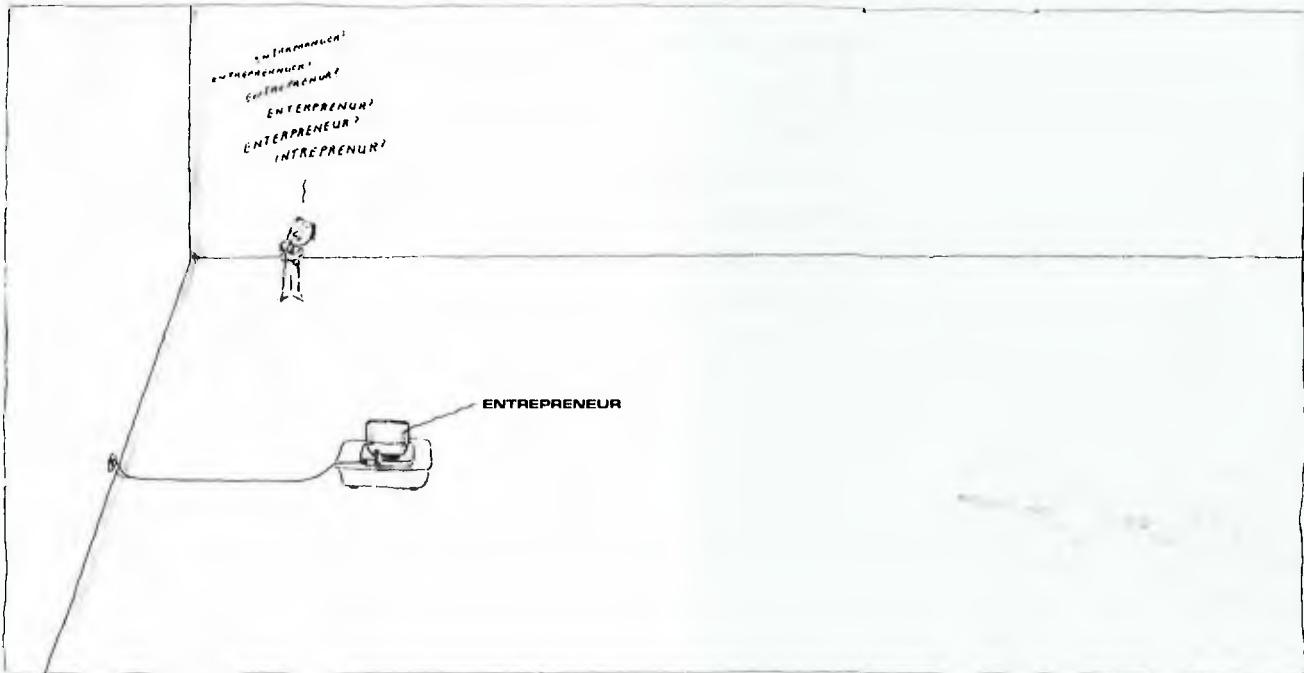


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Room service is improved and hotel power bills are slashed by the AE783 Room Status System from Ecotronics. Ian Robinson investigates this recent development, and discovers an IBM PC.

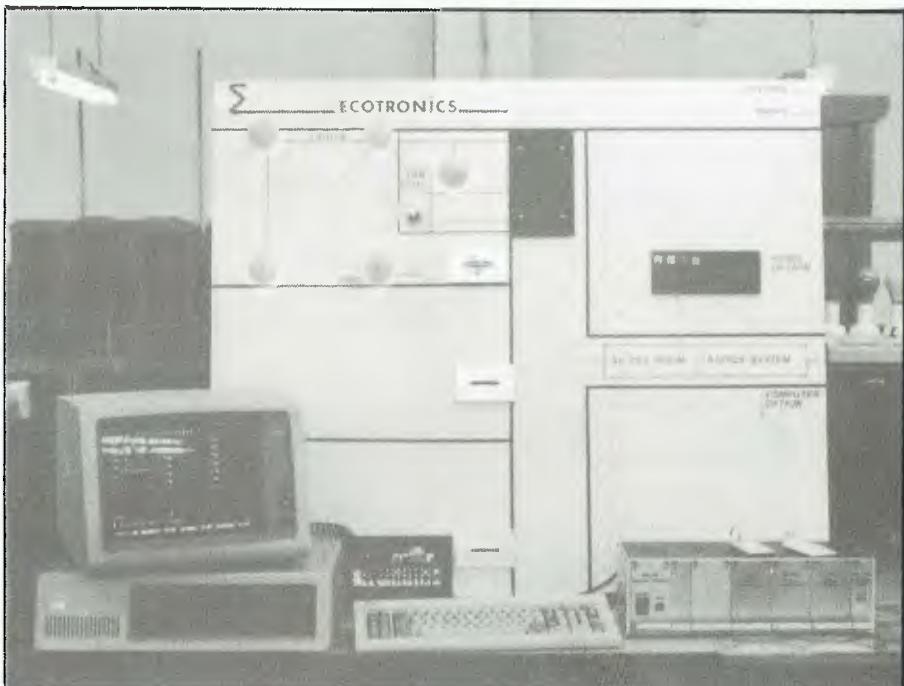
Letting PC Run the Hotel

Ever-increasing operating costs, and the world economic situation have forced the hotel industry, among others, to become increasingly energy-conscious. Because of their long hours and unpredictable occupancy rates, hotels usually receive power bills up to three times those of similar-sized city office blocks, so plans for future hotels will tend to aim at more efficient use of energy.

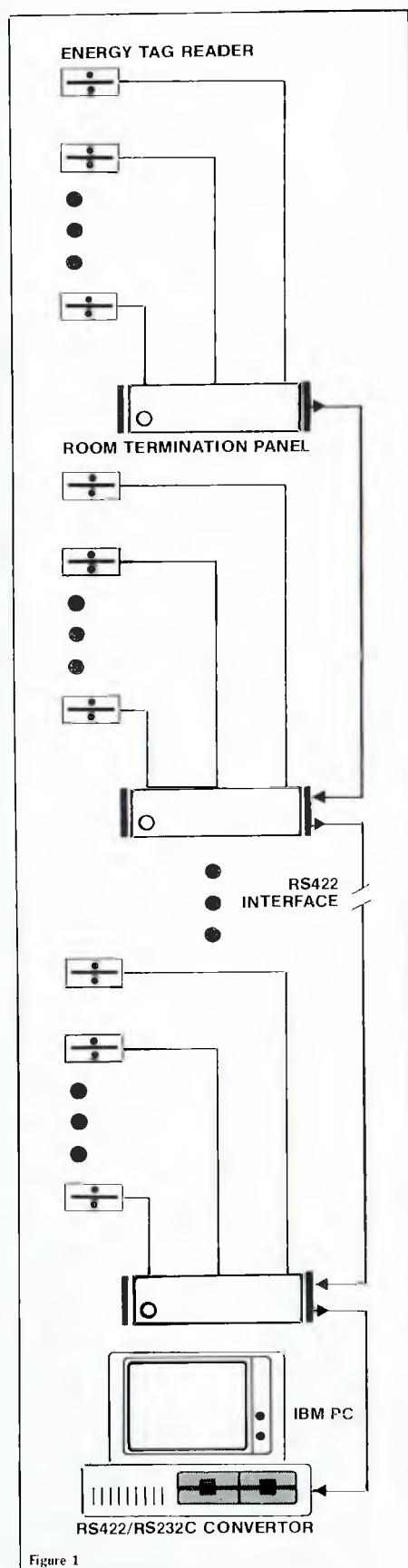
This so-called new generation of hotel development has understandably led to accelerated research into the application of microcomputers and high-technology products to monitor and control hotel energy consumption.

Overview

One such application, recently developed by Associated Electronic Services (AES) for Perth company Ecotronics, is officially known as the



AE783 prototype system in AES laboratory, Perth.



AE783 Room Status System. This product is actually the deluxe model in a family of energy-control systems manufactured by AES. The base model of the family is the AE383 Energy Tag System, which derives its name from the small plastic key-tags issued to each guest when checking in to the hotel.

Inserting the Energy Tag into a wall-mounted slot (just below the main light switch) will activate the air-conditioning and power to a guest's room. Removing the tag when leaving the room will disconnect the power. In this way, power can only be used when a room is occupied, thereby minimising energy consumption.

Although the Energy Tag readers can operate in a simple standalone mode as functional power-saving devices, the prime advantage of their design is the fact that they can be directly interfaced to a PC. Furthermore, the interface is bi-directional, which means that not only can the PC read the room status (occupancy, power use, and so on) but it can also send back control signals to the reader panels.

This feature allows the Room Status System software to maintain a comprehensive message-management system and to simultaneously generate a realtime display on the PC (color graphics) screen, showing the current status of every room on a floor. When a guest is out, any messages received by the hotel are typed in to the PC and

stored on disk. These messages may be retrieved and edited if necessary, otherwise a message indicator LED (located just below the tag reader slot) lights up when the guest returns. The guest can then contact the reception desk, where the operator retrieves the message from the PC.

Hardware

While it could be said that the PC is the heart of the system, the brains are somewhat further dispersed because, as well as the PC's 8088 central processor, there is a slave 6805 CPU on each floor of the hotel. All the Energy Tag readers on a particular floor feed into a single Room Termination Panel (RTP), which contains the 6805 and enough memory to store all the room status details. It is this unit that is linked to the PC via an industry-standard RS422 serial interface (detailed in figure 1).

The RTPs are linked in daisychain fashion, with the six-wire RS422 cable terminating at a special RS422/RS232C converter card, located in one of the expansion slots inside the PC. This AES custom-built card is linked to a standard RS232C serial communications card via a short jumper cable.

Therefore, the minimum configuration system requires a single disk drive and four add-on cards, including the color graphics display adapter and the disk drive controller,

AE783 Room Status System layout.



Simple two-bit AE383 encoding scheme.

ENERGY TAG ENCODING SCHEME

Empty room	○	○
Cleaner	○	1
Supervisor	1	○
Guest	1	1



Figure 2

leaving a free expansion slot in a PC (or three in an XT) for any additional user requirements such as extra memory.

Any of the popular multifunction cards incorporating a serial port could be installed instead of a standard serial interface, as all of the serial I/O is done through standard Basic calls.

The Energy Tags themselves are magnetically-encoded, using a simple two-bit protocol (no slurs intended) that distinguishes between hotel supervisors, cleaners, and guests (figure 2). The CPU within the RTP unit spends its life tearing around in a high-speed loop, interrogating each tag reader in turn, to determine who (if anyone) is inside a room. This method, known as polling, is a conventional way of monitoring multiple sensors.

Similarly, polling is used by the main Basic program to monitor the various RTPs.

Before any room can be occupied, it must be cleaned, then inspected by a hotel supervisor. When a cleaner's tag is inserted into the reader slot, a yellow symbol lights up next to the room number on the PC room status display. This symbol remains lit until a supervisor inserts his tag to inspect the room.

If the supervisor is unsatisfied with the condition of the room, he re-inserts his tag upside-down, cancelling the "cleaned" indicator. Otherwise the status display changes to a green indicator, meaning the room is ready for occupancy.

When a new guest checks into the room, the status indicator changes to red, and the system automatically prevents any double-booking. Further colored indicators show the status of power, air-conditioning, occupancy and messages.

Software

Software supplied with the Room Status System is compact and efficient. A single DOS 1.10 diskette contains the main Basic program and a small file of machine code subroutines, with the remaining space available for message storage. All of the software was originally written in Basic, to aid

ROOMS 101 - 130					
101	■	ALEXANDER	102	■	SMITH
104	■		105	■	REYNOLDS
107	■		108	■	
110	■	WAYNE	111	■	WOODS
113	■		114	■	
116	■	ASTMOR	117	■	
119	■	CLARKE	120	■	POOLE
122	■		123	■	
125	■	ZELAZNY	126	■	BRADBURY
128	■	ANDERSON	129	■	
					130

ROOMS 101 - 140					
101	■	ALEXAN	102	■	BROWN
105	■	RENO	106	■	SMITH
109	■		107	■	
110	■		111	■	WOODS
113	■		115	■	
117	■		118	■	CLARKE
121	■	MIVEN	122	■	POOLE
125	■	ZELAZNY	126	■	BRADBURY
129	■		130	■	
133	■		134	■	
137	■	BLISH	138	■	
					139
					140

ROOMS 101 - 150					
101	■		102	■	
106	■		107	■	108
111	■		112	■	113
116	■		117	■	118
121	■		122	■	123
126	■		127	■	128
131	■		132	■	133
136	■		137	■	138
141	■		142	■	143
146	■		147	■	148
					149
					150

Room Status System screen formats for hotel floors of 30, 40 and 50 rooms.

readability and to simplify customisation — after all, every hotel is different (unlike motels).

But this approach proved too slow for the rapid screen-updating required by such a system. Therefore, all of the screen-refresh and display-handling routines were rewritten in 8088 machine code, using the Microsoft MASM assembler. The result is an easily tailored package with an impressive (flicker-free) realtime color graphics display.

The main program is written in the dialect of disk Basic supplied with DOS 1.10, not only to ensure maximum compatibility with the various configurations of the PC (and compatibles), but also because this was the only way that the programs (plus Basic interpreter) could squeeze into a minimal 64K-byte system.

The program is self-booting via a small AUTOEXEC.BAT file and operation is simplicity itself. Every available system operation is activated by a single PC function key, with the rest of the keyboard used only for entering message text or room numbers.

Color-coded function key descriptors are detailed across the bottom line of the screen (a la Basic), with their background colors relating to the colored indicators next to each room number on the screen. The display software adjusts the screen layout according to the number of rooms being monitored, as can be seen

in the photos on page 73, showing typical floors of 30, 40, and 50 rooms. Guests names (or portions thereof) are displayed when adequate screen space is available.

The Room Status System has two different screen modes: a room status mode and a message entry/retrieval/editing mode. A single function key toggles between these modes, and another "rolls" the display to the next floor in the hotel, as the screen can display only one floor at a time. Other function keys alter the status of the room (empty, let, vacant, cleaned and so on), and allow editing and retrieval of guests' messages.

The layout and color-coding of the function keys has been well planned and efficiently programmed, giving the system a polished and professional finish. Hardware-based ventures often fall flat in this respect, but AES appears to have cut no corners. Furthermore, as the Basic source code is easily accessible to the user, any change or enhancement should be a relatively painless operation.

The RTP units are fully self-contained, and do not depend on the PC in any way. This means the Room Status System could be switched off at night if desired or, more importantly, other useful software could be used.

This would not affect the Room Status System, as all pending messages are safely tucked away on disk, rather than memory. The Room Status System can therefore be very much in

the background, or it could be running 24 hours a day, as the sole function of the hotel's PC.

The future

The AE783 Room Status System is being installed in two major new hotels in Perth — and was demonstrated recently at the Hotelympia exhibition in London. It has received rave reviews from many sectors of the industry. This is not surprising, as energy savings are estimated at a minimum of 50 per cent on lighting and 25 per cent on air-conditioning.

The Room Status System has an open-ended structure, which is fortunate because there are many directions for further improvement of this package. New hardware developments will result in improved tag-readers, so that encoded tags will eventually replace keys altogether.

These newer tags will be similar to credit cards, and could be used at the hotel souvenir shop, restaurant, vending machines or car park. Upgraded software could then be integrated with the hotel accounting and word processing systems. The system concepts could also be extended to other vertical markets, such as office blocks and apartments.

PC-based software/hardware packages such as the AE783 Room Status System represent the leading edge of microcomputer applications development, a field in which Australian companies have a great opportunity to participate and to compete with the rest of the world. Now that one Australian company has taken the initiative, it remains to be seen whether we can retain it.

Rear view of AE783 PC hardware showing serial cards and jumper cable.



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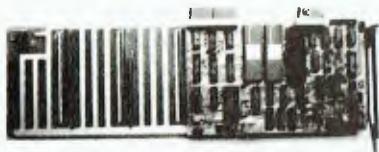
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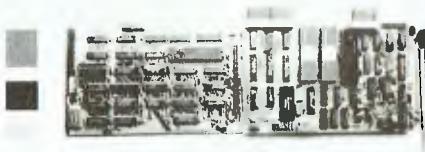
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WS 1



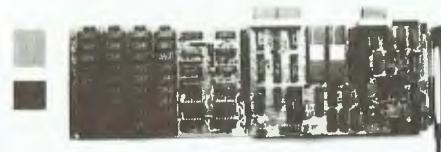
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WS 3



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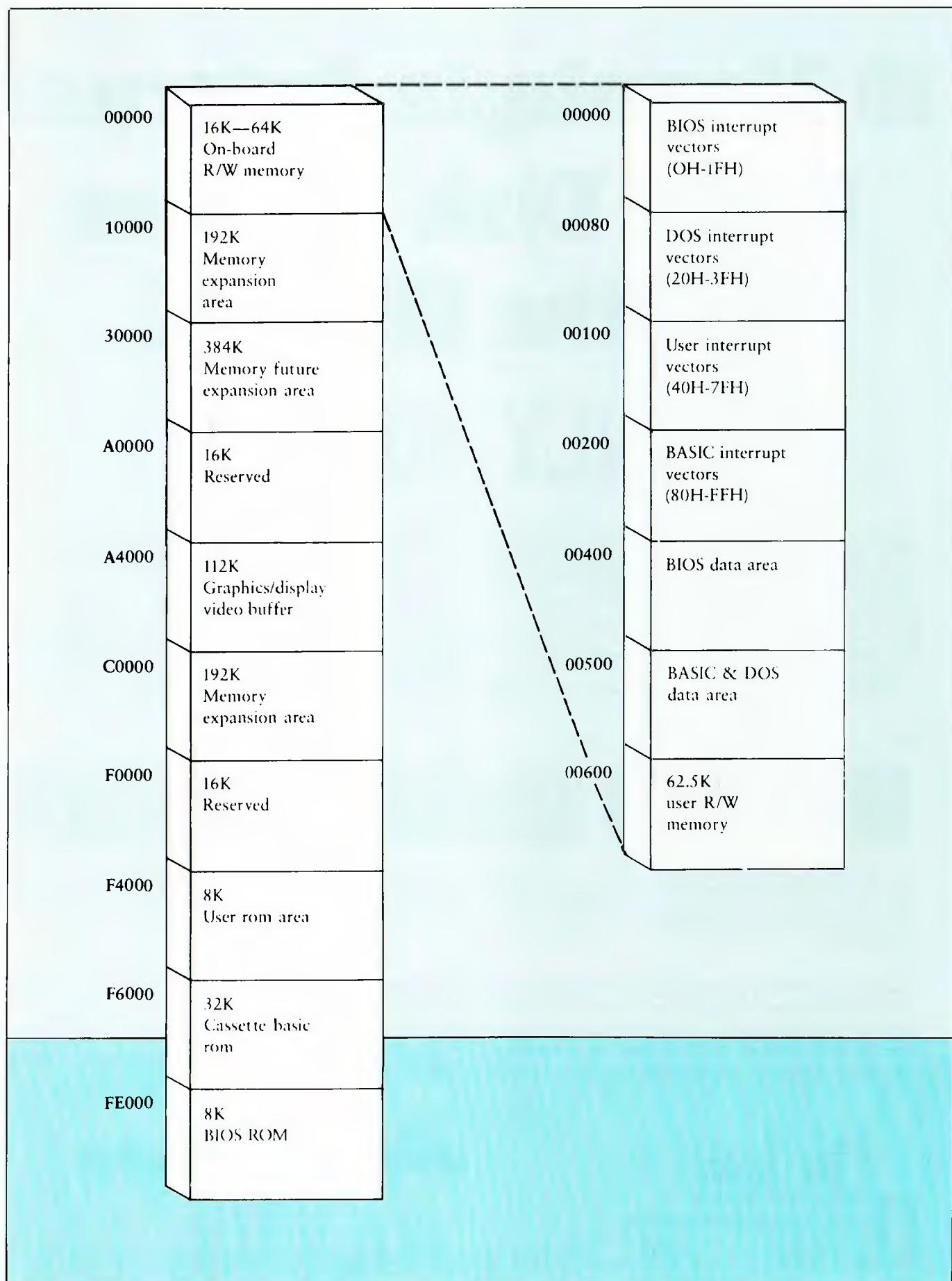


Figure 1: System memory map.

Despite their best intentions, applications programmers nearly always start mining the PC's system resources in search of speed and power. Leo Scanlon takes a look inside the PC BIOS.

Inside BIOS

Assembly language is machine-oriented rather than people-oriented like Basic or Pascal. People-oriented languages use symbols and command statements that programmers can read easily, but assembly language uses mnemonics, which represent the simplest instructions a microcomputer can perform.

Programs written in assembly language require less memory and run faster than those written in high-level languages like Basic and Pascal. To make the most of this compact storage and speed, an assembly language programmer must have a greater knowledge of the system's resources than a Basic programmer.

A programmer writing a complex program, such as a spreadsheet or word processor, needs to understand where programs and data can be stored in memory and where system information such as video and disk data are located. Likewise, the programmer must understand how the computer works.

Interrupts, which temporarily stop the processor from executing its program to perform particular activities such as reading keystrokes as they are

entered on the keyboard, must be fully comprehended.

The following excerpt is from the book IBM PC Assembly Language: A Guide for Programmers (Robert J Brady Co, Bowie, Maryland, 1983). In this article we look at some of the PC's built-in resources — its basic I/O system. Chapter 6, part of which is excerpted here, gives a brief description of the PC's system memory and then discusses interrupt service routines within the BIOS.

FIGURE 1 shows how the 8088's 1M-byte address space is allocated in the IBM Personal Computer.

As you can see, the lowest-numbered 64K-byte locations, 00000 through 0FFFF, hold the interrupt vector tables, the BIOS data area, and the read/write memory on the system board. The next 192K-bytes are available for add-on memory boards, which lets you expand the read/write memory to 256K-bytes. The 384K-bytes starting at location 30000 accept additional read/write add-on boards in a future version of the IBM PC.

Following the future expansion area is a block of 16K locations that IBM reserves for future use. (There is

another reserved 16K block at location F0000.) Location A4000 is the start of a 112K block of memory where the IBM PC stores graphics and display data.

The 192K-bytes starting at location C0000 currently provide ROM memory expansion, but may accept read/write memory in a future version of the PC. The 8K-bytes starting at location F4000 are available for a user-provided program ROM chip, which you can plug into a spare socket on the system board. Finally, the highest-numbered 40K locations, F6000 through FFFFF, hold the Cassette Basic Interpreter and BIOS ROM chips.

If you have the IBM Small Assembler, the Macro Assembler, or some other relocating assembler, you needn't worry where your programs and data are located in memory. However, you must understand the interrupt assignments in the system, so you can use the established interrupts and add others of your own.

Types 0 through 1FH, 20H through 3FH, and 80H through FFH are used by BIOS, DOS, and BASIC respectively. This leaves 64 interrupts (Types 40H through 7FH) available for your use.

Interrupt Number	Name	Initialized to	Initialized by	
0	Divide by Zero	0060:0097	DOS	
1	Single Step	0060:00A4	DOS	
2	8088 Nonmaskable Interrupt	NMI_INT (F000:E2C3)	BIOS	
3	Interrupt Breakpoint	0060:00A4	DOS	
4	8086 Vectors	Overflow	DOS	
5	Print Screen	PRINT_SCREEN (F000:FF54)	BIOS	
6	Unused	—	—	
7	Unused	—	—	
8	8253 System Timer	TIMER_INT (F000:FEA5)	BIOS	
9	Keyboard	KB_INT (F000:E987)	BIOS	
A	8259	Unused	—	
B	Interrupt	Unused	—	
C	Vectors	Unused (Reserved)	—	
D		Unused	—	
E		Diskette	DISK_INT (F000:EF57)	BIOS
F		Unused (Reserved)	—	
10	Video I/O	VIDEO_IO (F000:F065)	BIOS	
11	Equipment Check	EQUIPMENT (F000:F84D)	BIOS	
12	Memory Size	MEMORY_SIZE_DETERMINE (F000:F841)	BIOS	
13	Diskette I/O	DISKETTE_IO (F000:EC59)	BIOS	
14	BIOS Communications I/O	RS232_IO (F000:E739)	BIOS	
15	Entry Cassette I/O	CASSETTE_IO (F000:F859)	BIOS	
16	Points Keyboard I/O	KEYBOARD_IO (F000:E82E)	BIOS	
17	Printer I/O	PRINTER_IO (F000:EF2D)	BIOS	
18	BIOS Cassette BASIC	(F600:0000)	BIOS	
19	Entry Power-on Reset	BOOT_STRAP (F000:E6F2)	BIOS	
1A	Points Time of Day	TIME_OF_DAY (F000:FE6E)	BIOS	
1B	User-Supplied Keyboard Break	0060:0090	DOS	
1C	Routines Timer Tick	DUMMY_RETURN (F000:FF53)	BIOS	
1D	Video Initialization	VIDEO_PARMS (F000:F0A4)	BIOS	
1E	BIOS Diskette Parameters	DISK_BASE (F000:EFC7)	BIOS	
1F	Parameters Unused (Reserved)	—	—	

Table 1: BIOS interrupt vectors.

The BIOS interrupts allow you to access the powerful built-in features of the IBM PC. Table 1 summarises the BIOS interrupt vector assignments. As you can see, BIOS initialises most of these vectors. DOS initialises the rest.

In Table 1, the BIOS interrupts fall into five groups:

- 1. 8088 interrupt vectors (Types 0H through 7H)
- 2. 8259 interrupt vectors (Types 8H through 0FH)
- 3. BIOS entry points (Types 10H through 1AH)

4. User-supplied routines (Types 1BH and 1CH)

5. BIOS parameters (Types 1DH, 1EH, and 1FH)

In this section we will describe each interrupt group and emphasise the interrupts you can use in your programs.

8088 interrupt vectors

The first five of these interrupts, Types 0 through 4, are required in every 8088- or 8086-based system. The only other initialised interrupt in this

group, Type 5, is an interrupt that transmits the screen display to a printer.

Type 0, Divide by Zero: This interrupt activates if a divide instruction (DIV or IDIV) produces a quotient that is too large to be contained in the result register (AL or AH). The routine this interrupt initiates — which starts at location 0060:0097 — aborts your program by simulating a Ctrl-Break. It then displays the message 'Divide Overflow' and returns control to DOS.

Type 1, Single-Step: This interrupt lets you run programs one instruction

(AH) Operation	Additional Input Registers	Result Registers*
CRT Interface Routines		
0 Set Video Mode	(AL) = 0 40 x 25 B/W, Alpha (Default) = 1 40 x 25 Color, Alpha = 2 80 x 25 B/W, Alpha = 3 80 x 25 Color, Alpha = 4 320 x 200 Color, Graphics = 5 320 x 200 B/W, Graphics = 6 640 x 200 B/W, Graphics	None
1 Set Cursor Lines	CH Bits 0-4 = Start Line for Cursor CH Bits 5-7 = 0 CL Bits 0-4 = End Line for Cursor CL Bits 5-7 = 0	None
2 Set Cursor Position	(DH,DL) = Row, Column (0,0) Is Upper Left (BH) = Page Number (0 for Graphics Mode)	None
3 Read Cursor Position	(BH) = Page Number (0 for Graphics Mode)	(DH,DL) = Row, Column of Cursor (CH,CL) = Current Cursor Mode
4 Read Light Pen Position	None	(AH) = 0 Light Pen Switch Not Down or Not Triggered (AH) = 1 Valid Light Pen Values in Registers (DH,DL) = Row, Column (CH) = Raster Line (0-199) (BX) = Pixel Column (0-319,639)
5 Select Active Display Page (Alpha Modes)	(AL) = New Page Value (0-7 for Modes 0 and 1; 0-3 for Modes 2 and 3)	None
6 Scroll Active Page Up	(AL) = Number of Lines. Input Lines Blanked at Bottom of Window. (AL) = 0 Blanks Entire Window. (CH,CL) = Row, Column of Upper Left Corner of Scroll (DH,DL) = Row, Column of Lower Right Corner of Scroll (BH) = Attribute to Be Used on Blank Line	None
7 Scroll Active Page Down	(AL) = Number of Lines. Input Lines Blanked at Top of Window. (AL) = 0 Blanks Entire Window. (CH,CL) = Row, Column of Upper Left Corner of Scroll (DH,DL) = Row, Column of Lower Right Corner of Scroll (BH) = Attribute to Be Used on Blank Line	None

(continues)

Table 2: Video I/O operations with Type 10 interrupt.

(AH)	Operation	Additional Input Registers	Result Registers*
CRT Interface Routines			
8	Read Attribute/ Character at Current Cursor Position	(BH)= Display Page (Alpha Modes)	(AL)= Character Read (AH)= Attribute of Character Read (Alpha Modes)
9	Write Attribute/ Character at Current Cursor Position	(BH)= Display Page (Alpha Modes) (BL)= Attribute of Character (Alpha) = Color of Character (Graphics) (CX)= Count of Characters to Write (AL)= Character to Write	None
10	Write Character Only at Current Cursor Position	(BH)= Display Page (Alpha Modes) (CX)= Count of Characters to Write (AL)= Character to Write	None
Graphics Interface			
11	Set Color Palette (320 x 200 Graphics)	(BH)= ID of Palette Color (0-127) (BL)= Color Value to Be Used with That Color ID	None
12	Write Dot	(DX)= Row Number (CS)= Column Number (AL)= Color Value If Bit 7 of AL = 1, the Color Value Is Exclusive-ORed with the Current Contents of the Dot	None
13	Read Dot	(DX)= Row Number (CS)= Column Number	(AL)= Dot Read
ASCII Teletype Routine for Output			
14	Write Character to Screen, Then Advance Cursor	(AL)= Character to Write (BL)= Foreground Color (Graphics) (BH)= Display Page (Alpha)	None
15	Read Current Video State	None	(AL)= Current Mode—See (AH)= 0 for Explanation (AH)= Number of Character Columns on Screen (BH)= Current Active Display Page

*Note: Besides the registers listed here, these routines preserve CS, SS, DS, ES, BX, CX, and DX. All other registers should be considered destroyed.

Table 2 (continued)

at a time, so you can debug them. DOS makes this vector point to location 0060:00A4, which contains an interrupt Return (IRET) instruction. Thus, a Type 1 interrupt simply jumps to the IRET instruction, then returns to the instruction that follows INT 1.

Does this mean you can't single-step through a program? Not at all. It just

means you can't use the Type 1 interrupt to single-step. You can single-step with the DEBUG program's Trace (T) command, which executes one or more instructions, starting at the current CS:IP address or at a specified address.

Type 2, Non-Maskable Interrupt: For every interrupt but this one, you

can force the processor to ignore interrupt requests. To do this you set the Interrupt Enable Flag (IF) to 0 with a CLI instruction.

The Type 2 interrupt is non-maskable; it cannot be "locked out" or disabled. For this reason the Type 2 interrupt should be activated by some time-critical event, such as imminent

loss of power.

In the IBM PC, memory expansion options use the Non-Maskable Interrupt (NMI) to report storage errors. The service routine this interrupt calls, NMI—INT (starting address F000:E2C3), displays the error message Parity Check 1 or Parity Check 2. Then it locks out interrupts with a CLI instruction and halts the processor with HLT.

Type 3, Breakpoint: This interrupt lets you execute a program until the 8088 encounters a specified "stop" address, or breakpoint. As with the Type 1 (Single-Step) interrupt, DOS makes the Type 3 interrupt vector point to an IRET instruction at location 0060:00A4. The Type 3 interrupt is unimplemented because you can get breakpoints as an option with DEBUG's Go (G) command.

Type 4, Overflow: This interrupt performs an operation when the 8088 executes an Interrupt If Overflow (INTO) instruction. As with interrupt Types 1 and 3, DOS makes the Type 4 interrupt vector point to an IRET instruction at location 0060:00A4. DOS doesn't provide an interrupt service routine here because IBM can't anticipate what you wish to do in case

of overflow. They leave this decision up to you.

Type 5, Print Screen: The final interrupt in this group, Type 5, is a BIOS feature. The service routine this interrupt calls, PRINT—SCREEN (F000:FF54), saves the current cursor position, transmits the information on the screen to the printer, then restores the cursor. Hence, the Type 5 interrupt does exactly what the PrtSc key does, but does it under program control instead of from the keyboard.

Memory address 50:0 holds the status of the PRINT—SCREEN routine, as follows:

If the print operation is successful, location 50:0 contains 0; while the print operation is in progress, location 50:0 contains 1; if an error occurs during printing, location 50:0 contains 0FFH.

8259 interrupt vectors

The 8259 is an *interrupt controller chip* on the system board. This chip accepts interrupt request signals (that is, maskable interrupts) from any of eight different devices in the system. Upon receiving an interrupt request,

the 8259 passes the request signal and a device identifier code to the 8088.

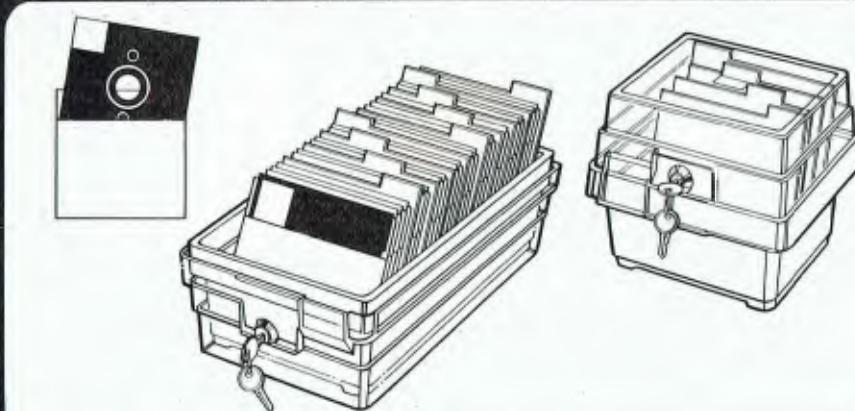
Presently, only three devices are attached to the 8259: the 8253 system timer, the keyboard, and the 5½in disk drives. Hence, only three of the eight possible interrupt types are in use. IBM reserves two other interrupt types for future versions of the IBM PC.

Type 8, 8253 System Timer: The 8253 is a chip on the system board that maintains a count of the system clock. You can use the chip to calculate the elapsed time between two events or to generate time delays. The 8253 automatically issues a Type 8 interrupt every 0.0549254 seconds. This means it interrupts the 8088 about 18.2 times a second.

The service routine the Type 8 interrupt calls, TIMER—INT (F000:FEA5), keeps track of the 8253's interrupts while interrupts are enabled (that is, while IF=1), so you can use this count to keep track of the time of day. The time count is a 32-bit value in two 16-bit memory locations, TIMER—LOW (0040:006C) and TIMER—HIGH (0040:006E). The TIMER—INT routine also initiates a Type 1C interrupt at every "timer tick".

BIOS makes the Type 1C interrupt

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(AH)	Operation	Additional Input Registers	Result Registers*
0	Reset Diskette System	None	None
1	Read Diskette Status	None	(AL) = Diskette Status (See Figure 3)
2	Read Sectors into Memory	(DL) = Drive Number (0-3) (DH) = Head Number (0-1) (CH) = Track Number (0-39) (CL) = Sector Number (1-8) (AL) = Number of Sectors (1-8) (ES:BX) = Address of Buffer	CF Bit = 0—Successful Operation (AH) = 0 CF Bit = 1 — Failed Operation (AH) = Status (see Figure 3)
3	Write Sectors from Memory	Same As Read Operation	Same As Read Operation
4	Verify Sectors	Same As Read Operation, Except (ES:BX) Is Not Required	Same As Read Operation
5	Format a Track	(DL) = Drive Number (0-3) (DH) = Head Number (0-1) (CH) = Track Number (ES:BX) = Sector Information	Same As Read Operation, Except AL Is Not Preserved

*Note: These routines preserve DS, BX, CX, DX, DI, SI, and BP

Table 3: Diskette I/O operations with Type 13 interrupt.

vector point to an IRET instruction, so you have to change the vector if you want the interrupt to do something useful. We'll discuss some possibilities for the Type 1C interrupt under User-Supplied Routines below. We'll also show you how to set and read the time count when we discuss the Type 1A (Time of Day) interrupt under BIOS Entry Points.

Type 9, Keyboard: BIOS activates this interrupt whenever you press a key. For all practical purposes, you should consider the Type 9 interrupt as a system interrupt. We'll discuss a more useful keyboard interrupt, Type 16, later in this section, under BIOS Entry Points.

Type E, Diskette: BIOS uses this interrupt to communicate with attached disk drives. As with Type 9, you should consider Type E as a system interrupt. We'll discuss a more useful disk interrupt, Type 13, under BIOS Entry Points.

BIOS entry points

Most of these interrupts perform input and output functions; they let you transfer information to or from the

peripherals in the system. Other interrupts in this group let you determine the system configuration and the amount of read/write memory installed, and initialise and read the time of day.

Type 10, Video I/O: This interrupt performs any of 16 different I/O operations with the video display, based on a value of AH. The service routine it calls, VIDEO—IO (F000:F065), begins by loading the starting address of the video buffer (a block of memory that holds display characters) into the Extra Segment (ES) register.

If your IBM PC has a Color/Graphics Adapter, the video buffer is 16K-bytes long and starts at location B8000. If your IBM PC has a Monochrome Display/Printer Adapter, the video buffer is 4K-bytes long and starts at location B0000.

With ES properly initialised, VIDEO—IO performs the specified I/O operation. Table 2 summarises these operations and shows you which registers are involved.

The 16 video I/O operations are divided into five groups: *CRT Interface Routines* let you set

the video mode and the line limits for the cursor, set and read the cursor position, read the light pen position, and manipulate the active display page. *Character-Handling Routines* transfer characters to and from the display screen.

Graphics Interface Routines let you transfer graphics dots to and from the screen, and change the colors.

The *ASCII Teletype Routine* provides a Teletype-like interface to the video card. It writes a character to the display, then automatically advances the cursor.

The *Read Video State Routine* reports the current mode, screen width, and display page.

Type 11, Equipment Check: The Type II interrupt determines what options are attached to the system, and returns that information in AX. The interrupt service routine, EQUIPMENT (F000:F84D), determines the amount of memory on the system board, the video mode, the number of disk drives, how many communication (RS232) cards and printers are installed, and whether anything is connected to the joystick port.

This information is irrelevant if you

are writing software for your own system because you already know what equipment you have. However, this feature is invaluable if you develop general software that can run on anyone's system.

Using the contents of AX, you can customise your software to run differently on various systems. To do this, you might use the contents of AX to call one of several system-specific procedures.

Type 12, Memory Size: The Type 12 interrupt determines how many 1K blocks of read/write memory are installed on the system board, and returns this count in AX. Since this interrupt only inventories the system board, and no add-on memory, it is probably useless for most applications.

Type 13, Diskette I/O: The DOS commands let you operate on files in the system. The Type 13 interrupt gives you a greater degree of control over disk information in that it lets you operate on individual tracks or sectors in the system.

As Table 3 shows, the Type 13 interrupt service routine, DISKETTE-IO (F000:EC59), provides six different operations, based on a value that has been passed to the routine in AH. The read, write, and verify routines each return a status byte in AL (see Figure 2).

To format a track (AH=5) you need to set up a table of address information in the extra segment. This table must contain 32 bytes; 4 bytes for each of the 8 sectors on the track.

The bytes are:

- Track number (0-39)
- Head number (0-1)
- Sector number (1-8)
- Number of bytes per sector (0=128, 1=256, 2=512, 3=1024)

Clearly, these operations are not for the faint-hearted. Before attempting them, you'd better know what you're doing! For guidance, consult the IBM Personal Computer Technical Reference manual.

Type 14, Communications I/O: This interrupt lets you transmit and receive information through the IBM PC's communication port. For more information, see the description of the

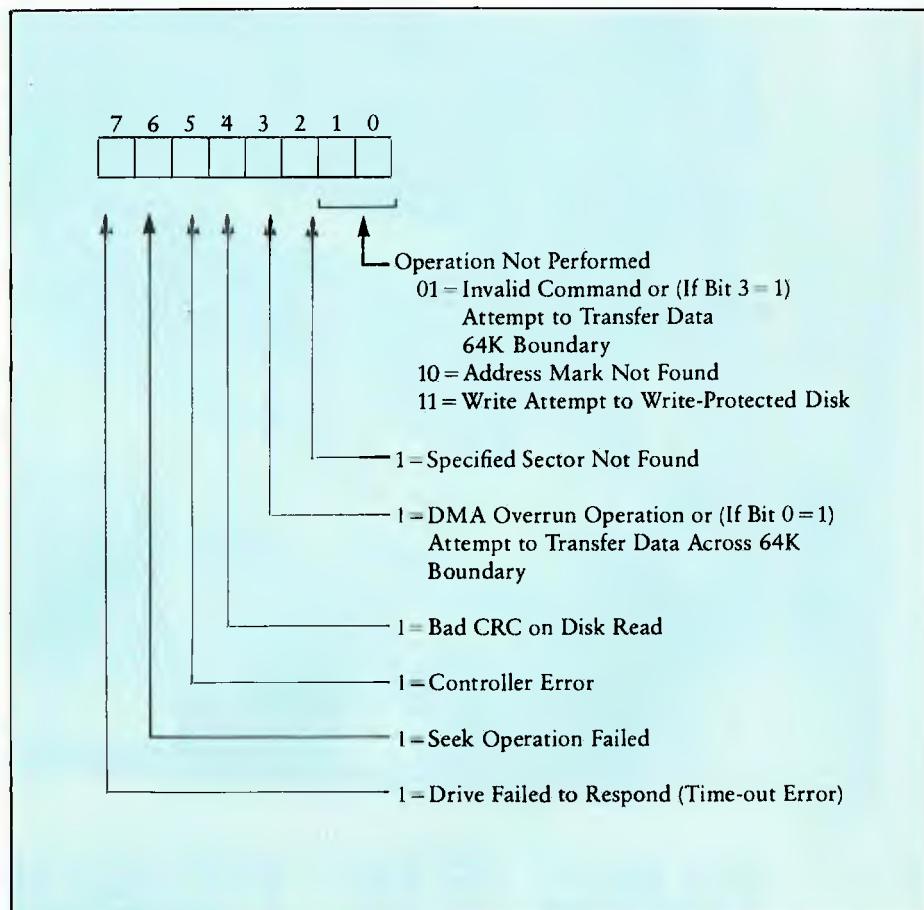


Figure 2: Diskette I/O status byte.

Asynchronous Communications Adapter in Chapter 2 of the Technical Reference manual.

Type 15, Cassette I/O: The commands provided in Basic let you operate on cassette files in the system. The Type 15 interrupt gives you a greater degree of flexibility in that it lets you operate on 256-byte blocks of cassette information.

The Type 14 interrupt service routine, CASSETTE-IO (F000:F859), provides operations to run the cassette motor on or off and to transfer one or more blocks to or from cassette, as selected by a value in AH.

Each block on cassette is comprised of the following fields:

1. An inter-block gap, called a leader, consisting of 256 bytes of all ones.
2. A synchronisation bit (0) to identify the end of the leader.

3. A synchronisation byte with the value 16H.

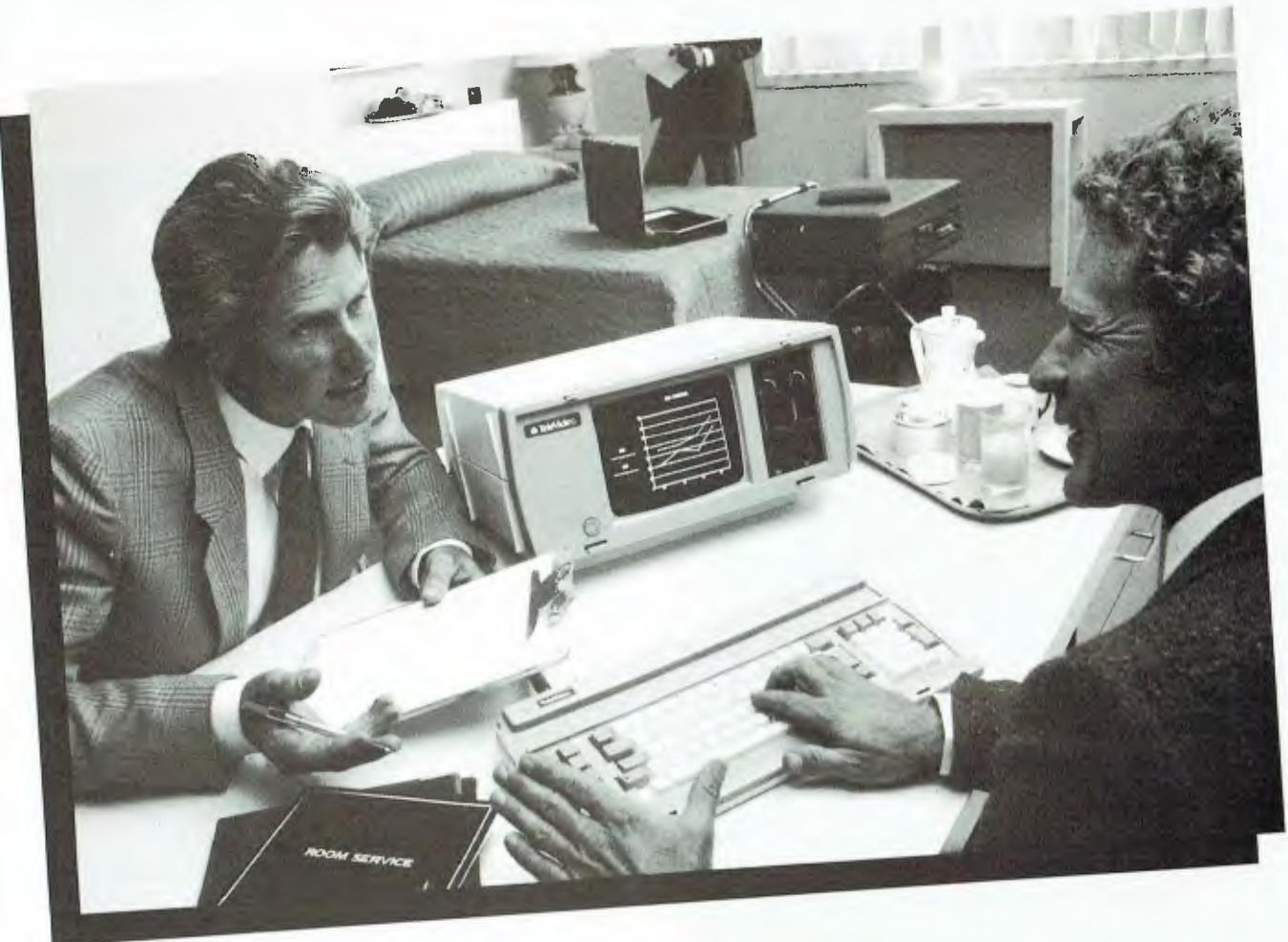
4. The 256-byte data block.
5. Two Cyclic Redundancy Check (CRC) bytes.

6. A trailer, 4 bytes of all ones.

The CRC bytes help ensure the validity of the data during a read operation. Briefly, as the computer writes a block of data to cassette, each data bit passes through a CRC register, which accumulates the bit values using a polynomial equation.

After the 256th bit has been written to cassette, the CRC register contains a 16-bit value that reflects the contents of that particular block. These 16 bits are written onto cassette, as 2 bytes, immediately after the data block.

Subsequently, when the block is read, the disk controller calculates another CRC value based on the incoming bit values. At the end of the block, this value is compared with the



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(AH)	Operation	Additional Input Registers	Result Registers
0	Print a Character	(AL) = Character to Be Printed (DX) = Printer to Be Used (0-2)	(AH) = Status of Operation (See Figure 4)
1	Initialize Printer	(DX) = Printer to Be Used (0-2)	Same as Print Routine
2	Read Printer Status	(DX) = Printer to Be Used (0-2)	Same as Print Routine

Table 4: Printer I/O operations with Type 17 interrupt.

2-byte CRC value read from cassette. If the 2 CRCs disagree, the cassette read program flags the operation as erroneous.

The *read block routine* turns on the cassette motor, waits until it comes up to speed, then searches for the leader. After sensing at least 64 all-ones bytes, the routine looks for the "sync" byte. If it doesn't find the sync byte, the routine resumes searching for a leader. (This sentence cries for a bad joke, but I resisted the temptation.)

Otherwise, it reads the data block 1 bit at a time and assembles these bits into bytes. Each time the routine has accumulated a complete byte, it stores the byte into the data buffer pointed to by ES:BX, then increments BX by 1.

After reading all blocks, the routine reads the CRC bytes and compares this value to the generated CRC value. If the two do not match, the routine sets CF, loads 1 into AH, turns off the cassette motor, and exits.

The *write block routine* turns on the cassette motor and waits for it to come up to speed, then writes a 256-byte leader of all ones to the cassette. It follows this with a sync bit (0), a sync byte (16H), and the first data block. After this block, the routine writes a 2-byte CRC value.

This sequence repeats until the byte count in CX has been satisfied. If the data in the last block is less than 256 bytes, the routine "pads" the last block with blanks. With the operation completed, the routine turns off the cassette motor, then exits. Unlike the read routine, the write routine does not generate an error report.

Type 16, Keyboard I/O: If your application is typical, you will probably use this interrupt more than any other. However, because of the wide range of

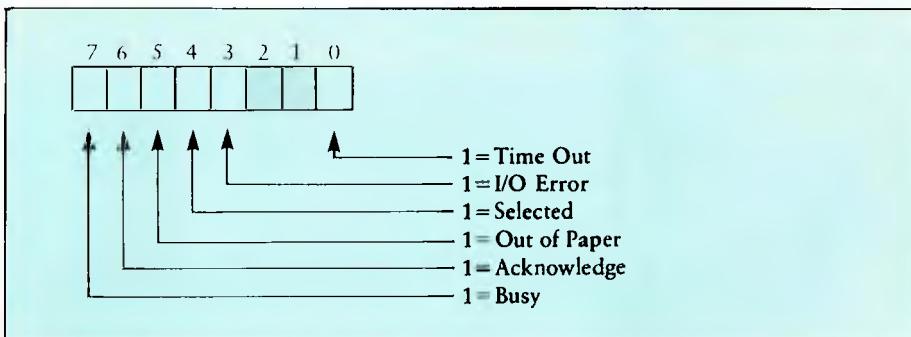


Figure 3: Printer I/O status byte.

possibilities it suggests and the versatility that IBM built into this keyboard I/O system, there is no room to discuss it in this article.

Type 17, Printer I/O: This interrupt lets you communicate with any of three printers in the system. With the three operations provided by the Type 17 interrupt service routine, PRINTER-IO (F000:EF02), you can print a character, initialise the printer port, or read the printer status. These operations are summarised in Table 4. All three return a status byte in AH (see Figure 3), but affect no other registers.

Type 18, Cassette Basic: This interrupt calls up Cassette Basic, which is installed in ROM in the IBM PC.

Type 19, Power-On Reset: This interrupt forces the computer to reinitialise from disk, if a disk drive is installed in the system. If the system does not have a disk drive, or if there is some error in either the drive or the floppy disk controller card, the computer enters Cassette Basic via the Type 18 interrupt.

Type 1A, Time of Day: Recall that the Type 8 interrupt maintains a count of the system clock via interrupts from

an internal 8253 System Timer. These interrupts occur at a rate of about 18.2 a second.

The Type 1A interrupt allows you to set this "time of day" count (a 32-bit unsigned number) or read its current value, so that you can use this facility to time events in your own programs. For instance, if you set the time count to 0, run a program, then read the time count, the resulting count value tells you how long the 8088 took to execute the program.

As usual, the value in AH selects the interrupt options. To set the time count, load 1 into AH and load the high and low 16 bits of the count into CX and DX respectively. To read the time count, load 0 into AH. The high and low 16 bits of the count are returned in CX and DX respectively. Further, the contents of AL tell you whether 24 hours have passed since you last read the timer. If 24 hours have not passed, AL is zero; otherwise, AL is nonzero. Both options enable interrupts by setting the Interrupt Enable flag (IF) to 1.

The sequence shown in Example 1 calculates the execution time of a procedure called MY-PROC.

The execution time of MY-PROC

```

STI          ;Enable interrupts
SUB CX, CX  ;Set time to zero
SUB DX, DX
MOV AH, 1
INT 1AH
CALL MY_PROC ;Execute the procedure
MOV AH, 0    ;Read the execution time
INT 1AH

```

Example 1: Calculate the execution time of a procedure called **MY PROC**.

This procedure uses **TIMER.LOW** from the Type 1A interrupt to generate a pseudo-random number between 0 and 51. The number is returned in AH. No other registers are affected.

```

RAND_51 PROC
    PUSH CX          ;Save registers affected by INT 1AH
    PUSH DX
    PUSH AX
    STI              ;Enable interrupts
    MOV AH, 0         ;Read the timer
    INT 1AH
    MOV AX, DX        ;Move low count into AX
    AND AX, 3FFH      ;and strip off high 6 bits
    MOV DL, 52        ;Divide low count by 52
    DIV DL
    POP DX           ;Restore AL
    MOV AL, DL
    POP DX           ;Restore DX and CX,
    POP CX           ;then exit
    RET
RAND_51 ENDP

```

Example 2: Generate a random number between 0 and 51.

is returned as a 32-bit value in CX and DX. To convert this value to a time in seconds, multiply it by 0.0549254 or divide it by 18.2.

Because the time count locations **TIMER—LOW** (0040:006C) and **TIMER—HIGH** (0040:006E) continually change, their contents—particularly those of **TIMER—LOW**—can be interpreted as a *pseudo random number*. Since the count locations are incremented, rather than changed randomly, they don't provide a true random number.

But because the time value is incremented 18.2 times a second, it is "random" enough for most applications.

Being 16 bits long, **TIMER—LOW**

can hold values between 0 and 65,535. To generate a random number between 0 and 51, as you might want to do in a card game program, you could read **TIMER—LOW** and divide it by 52. This division yields a remainder between 0 and 51.

Example 2 shows the procedure **RAND—51**, which returns a value between 0 and 51 in AH. Note that we strip off the high 6 bits of **TIMER—LOW** to prevent the division from overflowing.

User-supplied routines

Unlike the preceding interrupt types in this section, these two interrupts—Type 1B (Keyboard Break) and Type

1C (Timer Tick)—are called by other interrupt routines, rather than by your programs.

Type 1B, Keyboard Break: This interrupt is invoked whenever you press Ctrl-Break on the keyboard. BIOS initialises the Type 1B interrupt to point to an IRET instruction, but DOS reinitialises it to point to the same service routine as the Type 23 (Ctrl-Break Exit Address) interrupt.

Type 1C, Timer Tick: This interrupt is invoked by **TIMER—INT**, the routine that services the Type 8 (8253 System Timer) interrupt. Thus, like the Type 8 interrupt, the Type 1C interrupt executes about 18.2 times per second while interrupts are enabled.

The Type 1C interrupt lets you give the 8088 some additional task to do with each "tick" of the 8253. BIOS makes the Type 1C interrupt vector point to an IRET instruction at location **DUMMY—RETURN** (F000:FF53), so the Type 1C interrupt does nothing unless you change this pointer.

What can you do with the Type 1C interrupt? Well, you might have it display the value of the time count in decimal, thereby creating a time-of-day clock. Or you might have Type 1C's service routine examine the time count and do something when the time reaches a certain value. You can probably think of other possibilities for this useful interrupt.



Leo J. Scanlon is a former technical publications manager for both Computer Automation and Rockwell International. He is the author of seven computer books.

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Ian Robinson recommends the IBM Technical Reference Manual.

The Essential Reference Guide

I OFTEN feel sympathetic towards those faceless, nameless individuals who are instructed to write technical manuals, having worked late into the night many times in an effort to complete user manuals or program documentation, knowing full well there would be no accreditation whatsoever. It is for this reason that I could not help feeling just a twinge of sadness when I first browsed through the IBM Technical Reference, for here was a technical work of art that had obviously taken many meticulous man-years to complete, without any mention of the person (or persons) responsible. Nevertheless, this trend toward anonymity in technical writing has been with us since time began, and perhaps stems from a belief that such works are not creative.

Of course, those readers looking for a personal touch would be better off buying a Mills & Boon but, as the preface to the Technical Reference warns, "this manual is intended for programmers, engineers involved in hardware and software design, designers, and interested persons who have a need to know how the IBM Personal Computer is designed and works."

In contrast to the supposed shroud of secrecy that surrounds IBM and its activities, this publication hides nothing. The three sections of the manual include a system overview, a description of PC hardware and an exhaustive guide to the system software,

complete with a full disassembly of the ROM BIOS code. Following these sections is a comprehensive collection of Appendices, including a detailed 8088 instruction set summary, PC character set listings, circuit diagrams for all of the standard (and some of the optional) hardware, and a set of system specifications. (Did you know that the heat output for a PC is a maximum of 1083 BTU/hour?)

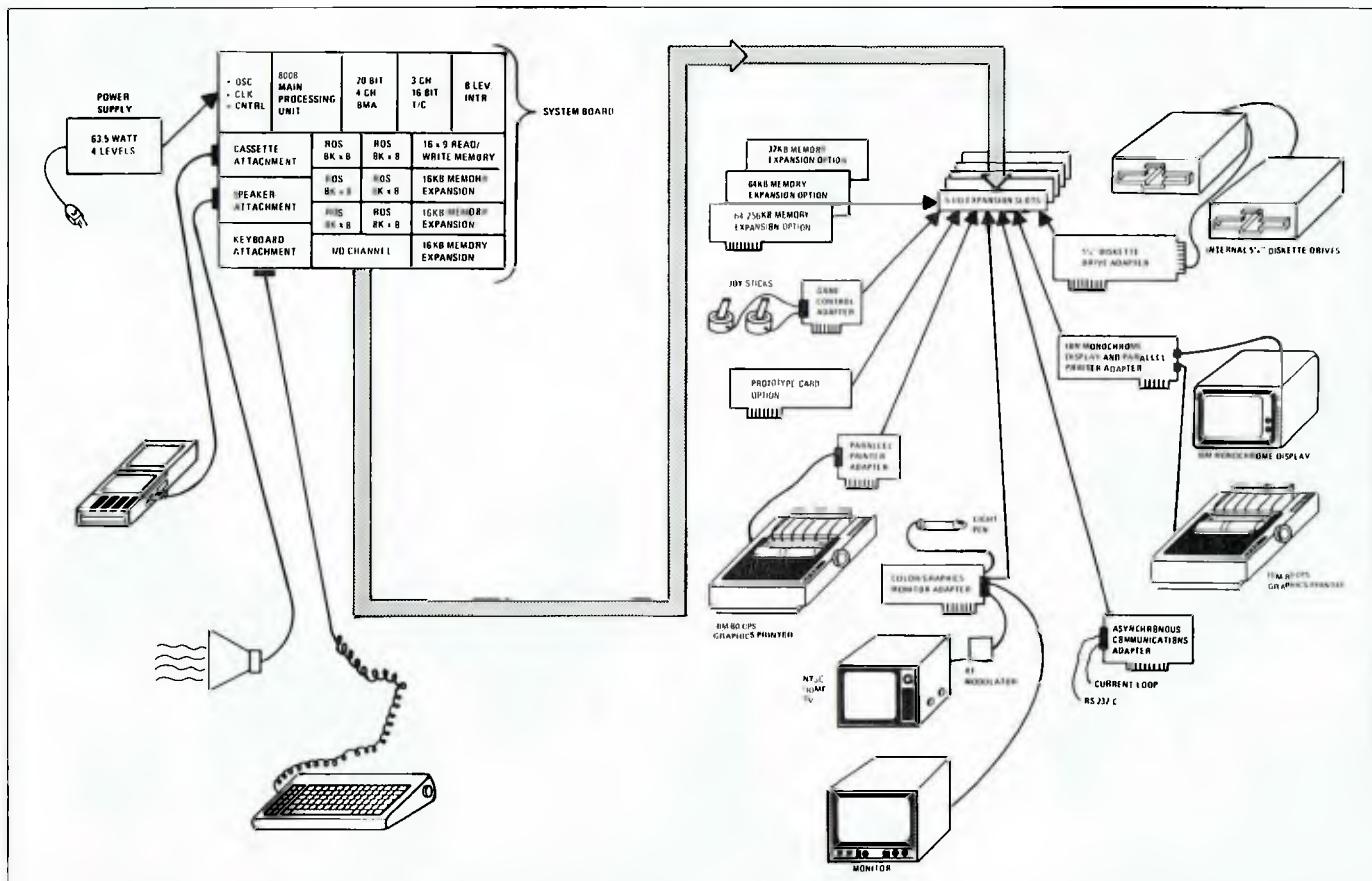
The initial system overview section is a brief three-and-a-half-page summary of the bits and pieces that make up a standard (Mark 1) IBM Personal Computer, which is virtually a reprint of the PC product description brochure without all of the sales hype. There is nothing startling to be found here; in fact, the section could almost be considered redundant. Perhaps the intent is to warn off novices who may have skipped the preface.

One annoying aspect of the Technical Reference is the unnatural page-numbering system. In fairness, this esoteric quirk is by no means restricted to IBM; many technical publications adopt this weird scheme whereby a page number consists of the chapter number followed by a dash and then another number, making it difficult to determine if pages are missing. In addition to this, the appendices have a numbering scheme all of their own, which uses letters of the alphabet as well. What is wrong with good old sequential numbering?

The hardware section forms the bulk of the Technical Reference, and consists of lengthy chapters covering the PC system board, power supply, keyboard, mono display/printer adapter, color/graphics adapter, disk drives, memory expansion options, game controllers, asynchronous communications adapter (alias serial port), and the PC prototype card. These subjects are examined to a depth that would satisfy even the most ardent hacker, almost to the point of naming individual electrons.

Having a background oriented slightly more towards software than hardware, I found the juiciest part of the Technical Reference to be Section 3 — ROM and System Usage. Here you will find details of interrupt vectors, parameter passing, keyboard encoding, memory maps and reserved addresses. This is the only section that I found a little lacking, but technically-oriented types may well disagree.

Appendix A of the Technical Reference makes terrific bedtime reading — a complete byte-by-byte listing of the PC ROM BIOS. You can browse through this disassembly time and time again, and always find something new. Appendix B is a very handy 8088 machine code instruction set summary, with a detailed bit-map of each instruction type, and a convenient instruction set matrix. Appendix C is a neat table of ASCII codes, keyboard



The system block diagram from the IBM Technical Reference manual.

characters, and color graphics display characteristics. Appendix D is a comprehensive collection of system logic diagrams, and Appendix E lists the unit specifications (dimensions, noise levels and so on).

The glossary at the back of the manual is an attempt to decode some of the technical gobbledegook contained in the Reference, but often it does not quite carry this off. (Take entry number nine for example. "Assembler: A computer program used to assemble.") The greatest howler contained in the glossary, however, pertains to the definition of the expression "DTR". As any hacker worth his or her salt will tell you, DTR refers to the "data terminal ready" signal used in serial communications. Indeed, DTR is used many times throughout the Reference in this very context, yet a glance at glossary entry number 34 will reveal "DTR: Distribution Tape Reel". It appears that some out-of-

touch mainframe-crazed blue-suiter at IBM was lumbered with the job of defining this term, and blew it by inserting an obscure and archaic mainframe expression. (Or did the early prototype PCs use IBM tape reels instead of disk drives? Somehow, I don't think so).

The Technical Reference is bound in the now familiar PC-standard 3-ring binder, in a tasteful shade of (you guessed it) blue. This makes quite good sense for technical publications, as they are required to lie flat when open, and pages with important diagrams or tables should be easily removable. Even the stock used for the pages seems to be reasonably solder-proof (perhaps even coffee-proof), but I was not brave enough to fully test this, as we only have the one copy.

Although originally released with the PC way back in 1981, the review copy was the most recent (January 1983) revision. A further revision is expected soon, following the

introduction of the upgraded PCs now being assembled at IBM's Wangaratta plant. These newer models have redesigned motherboards with a greater memory capacity (256K-bytes) and other minor circuitry changes.

Nevertheless, this would only require minimal amendments to Section 1 and 2 of the Technical Reference.

Without doubt, the Technical Reference is the definitive PC hacker's bible, and must surely be high on the wish-list of those who do not possess one already. The price is high (\$55), but dyed-in-the-wool hackers should be well used to the pangs of IBM prices. I should stress that the book is written for a very narrow and well-defined market, but those in that category will not be disappointed.

The Technical Reference is available from IBM Product Centres and all authorised PC dealers, for \$55. An XT version is also available for \$81.

REVAMPED VISI ON

Following staff layoffs and the resignation of the company's president, VisiCorp has announced a higher performance release of its Visi On integrated microcomputer software and a new version of the same software that does not require a hard disk drive.

Company chairman Dan Fylstra said the two moves are designed to address two main stumbling blocks for Visi On sales — speed limitations and system entry costs.

Visi On Version 1.2 will boost recalculation speeds for large spreadsheets up to 10 times, shorten time for data swapping between functions 30 per cent to 60 per cent, provide "instantaneous" paging through large word processing documents and offer 30 per cent improvement in spreadsheet scrolling performance, Fylstra said.

Version 1.2 for the IBM PC is scheduled for shipment in the US early this month.

The floppy disk-based Visi On "will have all of the features and many of the performance characteristics of hard disk-based Visi On, except that the Visi On applications and Help text will be stored on floppy disks which must be inserted when the application is started or help is requested," Fylstra said.

The company is also expected to disclose plans to bundle the Visi On mouse with two applications, to offer a software development tool kit for the PC XT and to develop another Visi On window that runs off-the-shelf MS-DOS applications.

The mouse will be offered with a "painting" application and a pop-up menu program, both written by

Mouse Systems Corp of California.

The bundle, selling in the \$US250 range, will be delivered by September, he said.

VisiCorp's new tool kit, scheduled for September shipment, will run on a PC XT with 512K-bytes of RAM under PC-DOS, according to Fylstra.

The MS-DOS window, designed to run "virtually any existing application" within the Visi On software environment, will be available by October, Fylstra said.

PC PRICE CUTS

IBM Australia has announced the release of PCs using the PC2 motherboard. The PC2motherboard is designed to take up to 256K-bytes of RAM, and incorporates minor circuitry changes to accommodate different memory chips.

IBM started using the PC2 motherboard in floppy disk based systems late last year. It has been available in most of the systems that were imported during the shortage of systems from IBM Australia. The few systems produced at IBM's Wangaratta assembly factory are reported to have the PC2 motherboard.

IBM has also announced substantial price cuts on the new configurations as well as the older PC1 systems, following reductions in Europe several months ago and reductions in the US in June. The price cuts range from 13 to 19 per cent, with a typical configuration of a 256K-byte RAM system unit, 320K-byte disk drive and monochrome monitor priced at \$4361, a cut of 19 per cent. A similarly configured XT is priced at \$8022, a cut of 16 per cent.

LOTUS WINNERS

Distribution rights for Lotus Corp software packages in Australia has changed hands.

Australia's largest software distributor, Imagineering, won a hard-fought contest last month when Lotus executives from the US came to Sydney to review distribution. Until now, Sourceware has handled the best-selling Lotus 1-2-3 spreadsheet package in Australia, and earned a strong reputation for support of the product. But the company had to compete with other distributors who had sourced the product from US wholesalers and offered the program at a substantial discount.

The battle for Lotus in Australia became a two-way contest between Sourceware and Imagineering when the latter, concerned at the slow acceptance of VisiCorp's Visi On, decided to go after Lotus, gaining an inside running by securing distribution rights for New Zealand.

Lotus Corp accepted Imagineering over Sourceware, apparently because of the company's distribution and financial strength, in preference to the service and support reputation built up by Sourceware. Sourceware, however, gained a consolation prize by being awarded rights as co-distributor in Australia. The company is likely to concentrate on selling the product into specific markets.

Imagineering will release Lotus Corp's second product, Symphony, in Sydney on July 26. The company has also indicated that it may adopt Lotus' policy of aggressively pursuing users who infringe software copyright.

COMDEX '84

by MARK GINSBURG

In April 1982, I had the good fortune to attend an Apple Fest Exhibition in Boston. Although only Apple products were exhibited, the many stands occupied the space of at least two football fields. It took an afternoon just to scan the exhibits.

A product called dBase II had just been released. (Little did I know just how intimately involved I would become with dBase II.) The show was more home- than business-oriented. The microcomputer was only beginning to emerge as a business tool. Many eager teenagers in blue jeans were soaking up the excitement.

Two years later at Comdex '84, the blue jeans were no longer predominant. It was business suits, cards, briefcases . . .

It was difficult to identify significant products in the true sense. Any product needs good marketing to be successful. But good marketing can obscure the weaknesses of some products, while some excellent products can go unnoticed because of inadequate marketing.

Lotus and Ashton-Tate, both sporting significant new products, were back to back in the centre of the main hall.

Lotus had a number of demonstration systems running Symphony. One of the applications used the communications module and was linked to the Dow Jones database. As well as the

demonstrations, a video booth seating at least 40 people a session was running 20-minute promotional program featuring the well known entertainer Victor Borge (conducting a symphony orchestra).

Ashton-Tate was demonstrating two new products, Framework, a third-generation integrated package, and dBase III. Framework includes word processing, spreadsheet, graphics, database, DOS access and outlining.

Framework includes Fred, a full function structured language that can be used to drive the system. Framework is fully compatible with Ashton-Tate's other products and its minimum requirements are a PC (or compatible) with 256K-bytes of dual 360K-byte disk drives and a monochrome monitor.

One of the exciting hardware products was the Hewlett-Packard Portable. It is evidently the state-of-the-art in lap computers. It has Lotus 1-2-3 and a full feature text editor (word processor) built in, so that these two packages are immediately accessible without need of a disk drive when you power up. You can also save files to a special memory drive.

These files can be stored for up to 16 hours with the power off and can be transferred later to floppy disk. Hewlett-Packard also supplies an interface that will allow easy file transfer between the HP Portable and the IBM PC.

Multilink is a cheap alternative to the more sophisticated network systems for MS-DOS users. It allows up to eight dumb terminals to be connected to a PC or XT. All the host machine needs is one asynchronous port for each terminal and the software to run the system. It supports a print spooler and file lockout capabilities.

Its drawback is that it polls each terminal so, as terminals are added to the system, the degradation becomes significant. The recommended configuration is one host and two terminals (three users).

A software company has written a dBase II compiler for which there is only a one-time fee of about \$US700. There is a large market for this product and if it proves to be good, it could be successful. A dBase III compiler is planned.

There is a definite upward swing in the quality of graphics packages for statistical and business presentation. Digital Research has released its DR Draw and DR Graph, both of which interface with the Palette System which generates 35mm slides.

The time spent at Comdex was worthwhile in every aspect. The size of the show revealed the magnitude of interest and investment in the microcomputer marketplace. Everything points toward continuing rapid growth in the computer, software and marketing business.



Power-base was regarded as the hottest new database product at Comdex.

HISOFT IN EDUCATION

Melbourne PC dealer HiSoft has exclusive Australian distribution rights to the Janet educational network and has recently installed a pilot site at the Hawthorn Institute of Technology in Victoria. Janet (which supposedly stands for Just Another NETwork) is a debugged version of the University of Waterloo microNet, created in the US for an educational field and marketed there by IBM.

The Hawthorn Institute system consists of a single PC XT (acting as the network file server) and 18 diskless PC workstations which are claimed to be part of the first shipment of Wangaratta PCs. Janet is based on a non-collision communications protocol and, therefore, the workstation PCs are connected in series via thick 24-wire IEEE-standard shielded cable, (quite expensive at about \$3.50 a metre) rather than the lightweight coaxial

cable used by most other PC networks.

An unusual aspect of the system is that the workstation PCs do not contain disk drives, supposedly because Janet is designed specifically for classrooms. Therefore, any files created must be stored on the single hard disk with the XT.

Each workstation is fitted with a custom boot ROM, which automatically logs the PC on to the network, following the usual power-up diagnostics, and transfers network support software from the file server. Once logged on, several extra network commands are added to the familiar DOS command set, but the network is otherwise transparent to the user.

Janet supports interactive language interpreters for APL, Basic, Cobol, Fortran and Pascal, which were also developed at the University of Waterloo. The workstations which need at least 64K-bytes of memory may have monochrome or color screens. Those used at Hawthorn Institute are fitted with 256K-bytes, the maximum available on a PC Mk 2 motherboard.

Although HiSoft regards Janet as an attractive product, because it has been targeted specifically at the lucrative education market, this does not represent its final decision on network packages.

Other products from HiSoft include revamped versions of its HiRags (now called HiFashion), HiMed and HiFinance packages. HiFinance Version 3.00 is a fully integrated accounting package designed for larger businesses. It incorporates a software interface to Lotus 1-2-3, enabling users to extract accounting data for forecasting or graphing.

PC XT GETS TOUGH

A NEW rugged version of the PC XT, intended mainly for industrial and military environments, has been launched in the US by IBM's Industrial Products Division. The new PC 5531 is functionally indistinguishable from the XT, and comes with the standard 128K-bytes of memory, 360K-byte disk drive and 10M-byte fixed disk.

But it has been adapted to cope with extremes of temperature, vibration, shock, power surges and dust, through modifications to the fan, ventilator, voltage circuitry, and the keyboard housing. It also has a "combination adapter" with a thermal sensor and a variety of input and output ports.

An IBM official said the 5531 would have a wide range of industrial applications and would integrate with other Industrial Division products, including robotics equipment and the industrial version of the Series 1.

The PC 5531 was first shown at the recent International Programmable Controller Conference in Houston, Texas, and will cost \$US6740 (compared with about \$US5000 for an XT); the 5532 display costs an extra \$US850.



HiSoft announces it has exclusive rights to the Janet network.

ROBOTS AND PCs AT AUTOMACH

A fortunate and timely alternative to the entropy of Data 84 was provided by Automach Australia '84, a conference and exhibition dealing with the latest developments in automated manufacture and robotics technology. Hosted by the Society of Manufacturing Engineers, the Automach exhibition (held on May 23 to 25 at the Sydney showgrounds) evoked an air of excitement reminiscent of the early personal computer shows, as exhibitors demonstrated a multitude of computerised manufacturing systems, applications packages and industrial robots.

The Federal Minister of Science & Technology, Barry Jones, gave the opening address, in which he talked about human factors to be considered when adopting robotics technologies, Australia's declining balance of trade, and the inability of tertiary institutions to provide suitably qualified graduates to the manufacturing industry.

Obviously oblivious to all these implications were the robots themselves, which dominated the Automach exhibition. An energetic collection of these tireless mechanical workaholics loaded, welded, sorted and painted their way through the four days of the

show, demonstrating the kind of speed and accuracy that could only be attributed to computer control.

An interesting aspect of the Automach exhibition was the proliferation of PCs and related products. The growing presence of microcomputers at such exhibitions serves to highlight future trends, as the evolving world of automated manufacture and robotics slowly progresses to within reach of the individual and the small business.

The PC featured prominently on IBM's industrially-oriented stand, and it now appears to have well and truly come out of the IBM closet, following its commercial success and widespread market acceptance. Application packages displayed included AutoCAD and VersaCAD, which were designed specifically for the PC.

VersaCAD is a general-purpose interactive drafting software package, appropriate for any drafting environment, including architectural, graphic design, civil, mechanical and electrical engineering offices. Marketed in Australia by Engsoft, the package was originally designed by US software house T & W Systems. VersaCAD features include on-screen help, dynamic graphics that may be moved, copied, rotated, scaled, imaged, or deleted, a flexible grid scaling system, windowing (zooming) for detail work, and a "snap" feature to keep the drawing precisely aligned.

Engsoft also markets PC packages for NC/CNC control, electrical circuit and logic design, road traffic system design, and many other engineering applications. The NCAPT3D program is a machine independent automatic programmable tool system for multi-axis NC/CNC machine tools, with contouring in two, three, four or five axes. The software outputs plotter data for cutter path verification, and CNC or punched tape output complete with machine codes and

co-ordinate data for automatically controlling NC/CNC machine tools.

Application packages such as these could well lead to the PC becoming a dominating force in the industrial environment, as it has in the office environment, with the advantage of delivering a much-needed standard and a common base for development.

The automated factory of the 1990s would supposedly involve computers in every stage of development, from contract bidding to raw material ordering, preliminary component design, modifications and product marketing, as well as in the automated manufacturing process itself. Such a concept requires a much higher level of functional integration than is currently available, so a major step toward the fully automated factory will be drafting of suitable industry standards — a fundamental aim of the Society of Manufacturing Engineers.

The annual Automach conferences are an important tool in this drive to standardise, and they provide a rare opportunity for the public to witness state-of-the-art robotics technology and PC applications in action. Automach Australia '85 is to be held in July next year, at the World Trade Centre in Melbourne.



VersaCAD running on IBM PC.



THE 3270-PC ARRIVES IN STYLE

By IAN ROBINSON

It appears the recently introduced IBM 3270-PC has toppled the PC XT as the flagship of the PC range in Australia.

But IBM Australia takes a slightly different view. The company regards the 3270-PC as an enhanced workstation rather than a deluxe PC. (Perhaps that's why they didn't name it the PC-3270). All official product descriptions and press releases treat the 3270-PC as a powerful office workstation, with the added bonus (if you happen to be that way inclined) of being able to be operated as a PC.

The 3270-PC is essentially a PC XT chassis and motherboard, with an enhanced keyboard and display. The eight expansion slots are almost filled to capacity. Apart from the standard PC floppy disk controller, optional fixed-disk controller, memory expansion board and printer adapter, there are some interesting new application cards.

One card contains the PC-mainframe linkup hardware (similar in function to the popular Irma card). Another is the 5272 color graphics display controller. Strangely enough, another card is required as a keyboard adapter because the enhanced workstation keyboard transmits in IBM's EBCDIC format. The keyboard cable plugs into the special adapter card, which is linked to the standard PC keyboard jack by a short jumper cable.

If you think about it, buying a fixed-disk version of the 3270-PC will leave you with the grand total of one remaining expansion slot, and a short slot at that!

The bulky 5271 keyboard looks very much like a standard PC keyboard with several extra keys around the edges. Ten system-specific keys sit in the position normally occupied by the PC function keys, while the function keys have been shifted to positions across the top of the keyboard. Their total number has been increased to 24 (but only the first 10 can be used by PC-DOS programs). The 122-key keyboard has PC-specific keytops inscribed in blue, while 3270 host keytops are in black.

The layout is more like that of an IBM DisplayWriter and the serially transmitted codes are in EBCDIC, rather than the widespread ASCII format. This is why the extra keyboard adapter card is used, one of the many compromises made by the 3270-PC's designers in the interests of workstation compatibility. An Autokey facility has also been built into the 5271 keyboard, allowing often-repeated sequences to be recalled with a

single keystroke.

Another special item of hardware necessary for the 3270-PC is the 5272 display, a 14in eight-color monitor with an 720 x 350 pixel high-resolution display. The anti-glare smudge-resistant screen is mounted on a tilt and swivel stand and is connected to a special display controller card inside the 3270-PC.

The 3270-PC communicates with any System/370, IBM 308x or 43xx mainframe processor via a 3274 cluster control unit. It can also be attached to a 4331 or 4361 systems display/printer adapter. Printed documents can be made from any host sessions using a 3274 printer. A PC printer can be used for personal computing sessions or for fast screen or window dumps.

The 3270-PC can display up to seven concurrent windows, including four host-processor sessions, a single PC application, and two "notepad" sessions. Full window manipulation features, including control over the size, position and color of each window, are provided.

The 3270-PC can emulate alphanumeric functions of the IBM 3178, 3179, 3180, 3278 or 3279 display stations.

The 3270-PC Control Program, incorporating an on-line Help feature, and PC-DOS 2.10 are standard. There is also a 3270-PC File Transfer program which transfers bulk data between host and workstation. (Host computer sessions can include VM/SP or MVS/TSO formats).

There will be the inevitable gap before the eventual flood of third-party application packages hits Australia, but there is a definite need for such products in a hungry, well-heeled market. As for the old favorites, a special 3270-PC version of Lotus 1-2-3 is due to be released soon, and no doubt other industry heavyweights will follow suit.

Seven configurations of the 3270-PC are available in Australia. These include four dual floppy disk versions (without graphics, with PS graphics, with APA graphics and

with both types), and three 10M-byte fixed disk versions (no graphics, PS graphics and APA graphics). PS in this case stands for Program Symbol graphics (used for host graphics applications) and APA stands for All Points Addressable (standard PC screen applications). Prices range from \$10,000 to \$14,000.

IBM is not worried that sales of the 3270-PC may bite into PC and XT sales. In fact, it will fill out the top end of the PC line. Dealers, however, realise that many corporate PC sales will be lost to the 3270-PC. Their concern is caused by the fact that 3270-PCs will only be marketed through official IBM channels, as are the remainder of the IBM workstation range. Some dealers are even considering looking around for a suitable 3270-PC compatible. Stay tuned . . .

introducing the 3270 Personal Computer. Immediately, the hybrid workstation was hailed as a landmark — the first product from IBM to truly bridge the gap between PC and mainframe. Observers predicted the 3270-PC would soon become the workstation of choice in large corporations.

Now, as the first 3270-PCs begin to ship, some of the problems involved in trying to link two different technologies are beginning to emerge. The 3270-PC combines all the capabilities of an IBM PC with the mainframe-accessing power of the 3270 terminal.

But, because mainframes and PCs evolved from totally different environments, they have distinctly different characteristics: different software architectures, communications capabilities, and file formats. To truly bridge those two technologies — to allow mainframe data to be transported into PC programs — the 3270-PC requires special conversion software. Most of that software, analysts say, must be customised to meet the requirements of each customer.

As a hybrid product, the 3270-PC is raising other issues as well. Who should be allowed to sell it? Who will write the software needed to make it useful? And who, within corporations, really needs to use it? While IBM and others try to sort out these issues, customers have begun receiving their first 3270-PC shipments.

So far, most customers have received small shipments. Bank of New England, based in Boston, has installed three systems for evaluation. Wells Fargo Bank in San Francisco has 35 of the workstations and plans to install "many, many more". The Oldsmobile Division of General Motors, meanwhile, is trying to cope with the massive installation of more than 100 3270-PCs — a fraction of the 700 new systems it plans to install this year.

A major feature of the 3270-PC is

its windowing capability. The computer's operating system, called the System Control Program, allows the user to run seven windows simultaneously. Four of the windows can run host applications, two are user "note pad", and the seventh is a PC-DOS window.

Ideally, users should be able to download mainframe files, transfer the host data to the DOS window, and incorporate it into PC programs. Because of different file structures, however, that file-transfer feature is not yet possible. Customers say they are waiting for third-party software companies to develop conversion utilities that will help solve the problem.

Despite the software conversion problems, early customers say they are pleased with the system.

"We feel IBM is committed to the product and will continue to add new features," said the director of administrative services at Oldsmobile, Earl Hamilton. "So we feel it's a sound investment. Our biggest disappointment is that we can't use the graphics."

IBM has promised to have graphics boards available late this year.

Paul Callahan, office systems analyst at Bank of New England, recalled a series of hardware and software hurdles encountered in trying to expand the system's memory with third-party boards, and in trying to run XT software in the DOS window. But most of the problems have been resolved, and Callahan said he was impressed with the system's potential.

IBM's instal-it-yourself is also having an effect on dealers. While a number have become as sophisticated and specialised as traditional systems houses, they are unable to sell the 3270-PC.

That policy may be changing. According to dealers who have been negotiating with IBM over the product, the company is considering a program that will allow select,

A MICRO FOR BIG COMPUTER USERS

By LISA RALEIGH

Faced with persistent demands from customers for a product that would link their personal computers to mainframes, IBM responded last October by

qualified dealers to carry the 3270-PC. Such a program would probably benefit IBM as much as it would dealers, according to Amy Wohl, president of Advanced Office Concepts, a consulting firm based in Bala Cynwyd, Pennsylvania.

The 3270-PC, Wohl said, is perfectly suited for value-added dealers and value-added resellers. "It's exactly right for them," she said. "It's a product that requires hand-holding, installation, and software — all the things that value-added dealers are best at". Wohl expects IBM to establish a program allowing select dealers to carry the 3270-PC along with other high-end products that are introduced in the future.

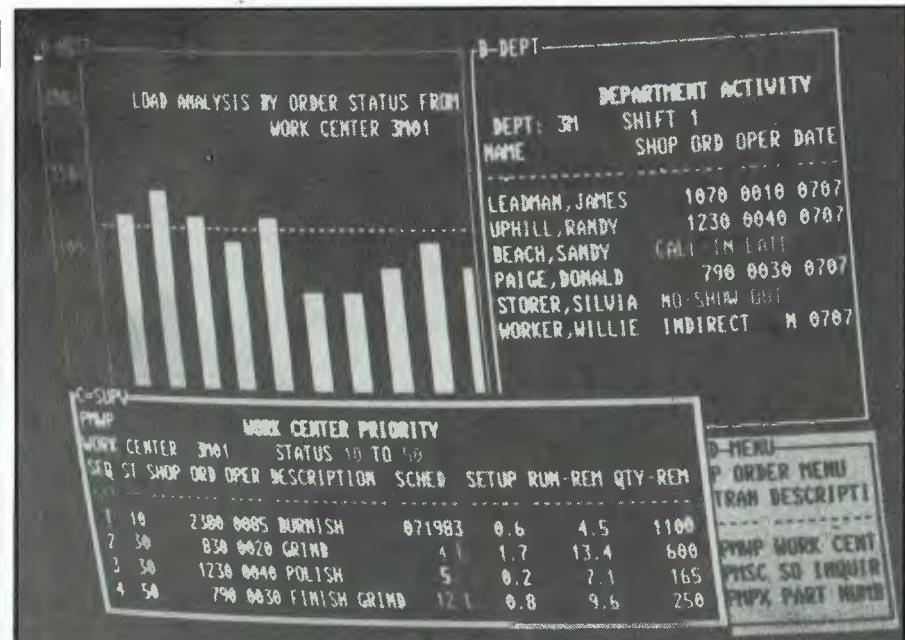
Some users have very high expectations for the 3270-PC's impact on corporate productivity. By giving managers access to vast amounts of mainframe data and the ability to work on that data on a PC, they believe the 3270-PC will act as a catalyst for greater, more imaginative corporate productivity.

"The whole concept of wedding the PC with the power of a mainframe is extremely exciting," said Wells Fargo executive John Cipriano. "IBM really wrung its hands over this product. But in the end, they listened to their customers and responded with one workstation that does both things.

"In my estimation, the 3270-PC is more advanced and more powerful than either IBM or its customers know. I think a lot of interesting developments will come out of it."

Companies are divided over what types of users the 3270-PC suits. Both Wells Fargo and Oldsmobile plan to install the 3270-PC for use by both data processing professionals, staff managers and company executives. Oldsmobile's Hamilton said his division had more than 1000 computer devices accessing the company's mainframes.

Not all customers, however, believe the 3270-PC is suited to



Window structure on the 3270-PC screen.

widespread use by executives and staff managers. At Bank of New England, the systems are being used by data processing professionals for program development and to monitor mainframe security.

"I don't really see it as an executive workstation," said Paul Callahan. "When IBM introduced the 3270-PC, it released two marketing ideas: that the machine could be used by DP professionals and by management professionals. I don't think it will make it in the management professional market."

Callahan is not alone. Amy Wohl said similar workstations tailored specifically for management would be introduced by IBM.

"Among our clients," said Wohl, "the 3270-PC is being installed mainly where the user intends to provide his own software and programming. It seems to be going more into traditional data processing applications and less into end-user environments."

Despite the software conversion problems posed by the 3270-PC, users appear to be enthusiastic. And

analysts expect the product to ship in substantial quantities this year. Wohl expects "a few hundred thousand" units to be installed this year, and Yankee Group, a Boston research company, estimates 175,000 3270-PCs will be shipped.

Who will provide the conversion software that is needed to make mainframe data useful in the PC-DOS window? The need for such software presents a wide-open market for third-party software developers, and IBM has been courting those companies feverishly.

But, according to Brian Boyle, an analyst with Gnostic Concepts of California, the packaged conversion utilities that these companies may write will only assist users in converting their mainframe files. Most of that conversion, he said, requires custom programming.

Rather than viewing the 3270-PC as a revolutionary product, Boyle regards it as "half a revolution" — a hardware product in search of software solutions. Yet, he said, the enthusiasm of customers is understandable.



NUMBER CRUNCHING: Future Computing's recent forecasts for PC and XT shipments are significantly more conservative than figures that have been cited elsewhere in the past. Speaking at Comdex, Egil Juliussen estimated that IBM shipped about 450,000 PCs and XT's last year, notably lower than the 750,000 figure that has been widely circulated.

IBM's 1983 revenues from PCs (including software) were estimated at \$US1.5 billion worldwide, Juliussen said, making IBM the leader in personal computer revenues, followed by **Apple** with about \$US1.1 billion in 1983. Apple, however, took the lead on units. According to Juliussen, Apple shipped an estimated 637,000 computers last year, including 600,000 Apple IIes, 30,000 Apple IIs, and about 7000 Lisas. Juliussen expects Apple to ship some 900,000 IIes and IIcs alone this year, not including shipments of the Lisa and Macintosh. IBM is expected to ship about 1.2 million units this year, he said.

IBM CLAMBAKE: Everywhere we turn these days, we hear reports that IBM has a notebook-sized portable in the wings. The problem with these rumors is that they are never accompanied by hard data.

Everyone just seems to be "sure" that IBM must be working on the latest notebook-sized technology. Well, it is true that, at any given moment, IBM is likely to be working on a half-dozen new prototypes, most of which will never make it to the manufacturing stage.

Nonetheless, at **Hewlett-Packard's** unveiling of its notebook-sized computer on May 10, the hottest gossip revolved around an IBM notebook computer project reportedly code-named Clamshell.

According to the rumor mill, a large US government customer is reportedly exchanging information with IBM.

Actually, what makes the

government connection plausible is the fact that federal agencies such as the National Security Agency and the CIA are among the biggest customers for pricey notebook-sized computers like the GRiD Compass, manufactured by **GRiD Systems Corp.** Since GRiD is having problems — including revenue shortfalls and top management defections — it makes sense that federal government agencies might turn to a company such as IBM.

IBM is reportedly toying with electroluminescent display (ELD) technology as well as liquid crystal display (LCD) technology. LCD screens have been largely confined to 16 lines, while electroluminescent displays have better screen resolution and 24-line screen capability.

IBM has been evaluating micro disk drives, and is reported to have let a large contract out to bid for 3½in floppy and Winchester drives. It's hard to image what IBM would use those drives for except a new notebook-sized computer.

But why would IBM want to introduce a snazzy new lap-sized system so soon after the less-than-impressive introduction of its Portable PC, a 14kg luggable that was greeted with a yawn when it was introduced in February? If IBM does have a lap-sized prototype ready for introduction, it's not likely to unleash it soon, since it would probably kill the market for the company's unimaginative Portable PC.

PC BUBBLE: It appears the PC will soon be offered in a new configuration sporting bubble memory — at least that's the word from a small company based in Redmond, Washington. A spokesman from **Hicomp Computer Corp.**, which manufactures bubble memory boards for the IBM PC, says the company has won a competitive bid to supply IBM with bubble memory cards for a new product based on the PC.

Two versions of the memory cards are available: one with 256K-bytes, the other with 512K-bytes of non-volatile, high-speed storage on a card. According to the spokesman, the new IBM configuration for the PC is targeted at environments where non-volatile, rugged, bubble memory is important.

LICKING WOUNDS. Projections for PCjr shipments have been falling. Late last year, **Future Computing Inc.** estimated that IBM would ship more than 500,000 PCjrs this year. By February, companies like **Quadram Corp.** had tamed their estimates to a more conservative 350,000 machines. At the Comdex show, Egil Juliussen, chairman of **Future Computing**, shaved his forecasts even further. Juliussen, now estimates IBM could ship as few as 100,000 PCjrs this year. His company's earlier forecast, Juliussen said, "was based on some assumptions that just didn't work."

"Right now, depending on what IBM does, we believe they will ship anywhere from 100,000 to 275,000 in '84," he said.

"It all depends on how quickly IBM can fix the product." According to Juliussen, IBM's biggest mistake in introducing the PCjr was its failure to position the machine clearly.

"IBM tried to position it as a home computer," Juliussen said, "but 'PCjr' implies a smaller version of their existing PC, and the IBM label means 'office'. So, consequently, their positioning wasn't strong enough to pull in the home buyer."

So what must IBM do to "fix" the PCjr? According to Juliussen, a first-aid kit should include a new keyboard, more memory, a second disk drive, and a clear repositioning through advertising. Aaron Goldberg, an analyst with **International Data Corp.**, says the PCjr would also benefit from a larger software base and a price adjustment, which appears to be on the way.

Lotus Development Corporation is a phenomenon. President Mitch Kapor has done the obvious so easily that it is difficult to separate the reality of his achievement from the myth. Anita Micossi talked to him about Lotus.

In the Lotus Position



It's already dark outside the Lotus building when Mitch Kapor comes out to greet me. "Here's a badge," he says, handing me a card on to which he's quickly scrawled my name. "Keep it as a souvenir," he chuckles, clearly unimpressed by protocol.

I follow the 33-year-old president of Lotus Development Corp into a warmly lit building, down a carpeted hallway, past glass-walled cubicles, to his corner office. "The only reason mine is bigger," he says, "is that we have meetings in here."

I've been to enough computer business sites to know that the dress code in this sector of the economy is looser than, say, in banking or the oil

industry. So Kapor's man-of-the-people look doesn't seem odd.

When two women walk into the office during our interview to get a cup of coffee from the communal pot, however, I am surprised at the casual accessibility of the president's space. When Kapor mentions that the executives don't have designated parking spaces at Lotus, I begin to wonder just what kind of operation he has here.

"Don't give the impression that we're running this like a food co-op," he interrupts his train of thought several times to emphasise. The third time he says it, he smiles sheepishly. "It's not that I have anything against food co-

ops." We both grin at the thought of this symbol of the philosophy of our formative years.

It's a long way from the laid-back, consensual decision-making, communal counterculture of the 1960s to today's high-tech, rapid-fire, bottom-line-oriented microcomputer business. But Mitch Kapor, whose personal philosophy was given direction in one of these worlds and shape in the other, spans the distance with apparent grace and obvious success.

A varied career

Kapor is founder and president of Lotus, whose software package Lotus 1-2-3, first shipped in January last year, quickly outstripped its major spreadsheet competition by hitching a ride on the high-flying IBM PC. Almost immediately, Lotus 1-2-3 became the industry standard for integrated productivity software.

After graduating from Yale with a bachelor's degree in psychology, Kapor worked as a disc jockey, a transcendental meditation instructor, and a counsellor before stumbling into the world of computers. Although he had taken some programming classes in high school, he didn't really connect with computers until 1977, when he bought a TRS-80 Model 1.

Kapor taught himself to program in Basic and wrote an integrated program called Tiny Troll. He went on to create VisiPlot and VisiTrend, add-ons for

VisiCalc. In 1980, Kapor joined VisiCorp in California for what he calls "the world's greatest internship".

With the money he made from VisiPlot and VisiTrend, and with the knowledge gained from his West Coast "internship", Kapor returned to Massachusetts and established his own company in April 1982.

The challenge for Kapor was to build a company that is not only successful and enduring but which embodies the values to which he is personally committed. To profile Mitch Kapor is to probe the philosophy of Lotus.

When Kapor calls people the number one asset at Lotus, he's not just repeating an overused slogan. He rejects a system that puts organisational needs above personal needs and pits worker against worker in a struggle for limited resources and rewards. Not only doesn't he believe in it on principle, he recognises that it doesn't pay off in practice.

"I think things only look 'good for [the] company' and 'bad for people' in the short term ... What's going to work in the long run is a livable structure for people; livable workloads and reasonable expectations.

Nice talk, but how do you make it happen? First of all, Lotus puts its money where its mouth is. The company offers its employees excellent health benefits and provides them with a generous profit sharing plan.

But it is the intangibles — trust, self-respect, feeling useful and appreciated — that keep people going and motivated to stretch to their limits. Creating an atmosphere that promotes individual well-being is a priority at Lotus.

Achieving this starts with a humanistic code of ethics. "Fairness and openness," Kapor says, "should characterise how people deal with each other, regardless of where they are in the organisation or how long they've been here."

Take hiring practices. In most companies, managers mock up a job description just to get the boss to approve a new employee. Kapor says: "What happens is people come on board only to find out that they're

doing something totally different than what they thought they were hired to do. This is very demoralising."

At Lotus, Kapor says, a job description is a fair, straightforward, and functional document. "When somebody comes in, we lay it out: these are your responsibilities, this is who you're going to be working with, this is how you'll be evaluated, this is your career path," he says.

Kapor disregards formal channels. "If I'm involved in product design, I'll work with the technician. I won't send memos through a vice-president."

As it approaches 5pm and the few remaining employees walk past Kapor's glass-walled office on their way out, the boss talks about Lotus's corporate culture. "There is the autocratic style in business, where wisdom is received from on high; where policy flows from the top down; where there are strict, impersonal measures of performance; where people get put on the spot a lot; where fear rules ... Lotus is at the other end of the spectrum."

You can see disdain for hierarchy in the very design of the Lotus workplace. The First Street building was a brick and wood shell when the company acquired it. Acoustically sealed, glass-fronted offices were built to allow privacy while permitting visual interaction, thus "encouraging people to make casual contact, which leads to spontaneous problem solving," Kapor says.

The philosophy of casual contact also applies to the boss. All 300 members of the Lotus team know that,

if they reach a dead end in trying to resolve a problem, they can come and talk to Kapor.

In case the employees are too shy to seek him out, Kapor solicits input in weekly staff meetings. Everyone is invited to the Tuesday morning meetings, which draw as many as 150 to 175 people.

"Anybody can say anything they want. And I run those meetings every week myself," Kapor says.

Keeping in touch with the workers and fostering a spirit of collaboration is more than a weekly ritual. For example, in product development, "Chances are, the people directly involved in a project know better than their managers and their managers' managers what really has to be done," Kapor says. "They're the problem solvers. They're the people who meet to sort things out. Achieving the highest productivity comes from allowing these people to have a say in what goes on."

To stay in touch with his troops, Kapor disregards formal channels. "If I'm involved in the product design, I'll work directly with the technician," he says. "I won't send memos down through the vice-president of software development.

"But don't suggest that this place is run like a food co-op." There it is again. "Accountability and responsibility are clearly vested at all levels. You've got to know who to go to, who owns the responsibility for a particular thing." Kapor hits on the fatal omission of those otherwise grand social experiments of the 1960s.

He also hits a bump in his own thought process. "Throw out everything I've said for the last hour and a half," he suddenly says. I expect a profound summation. Instead, Kapor expresses "the key" to understanding Lotus with a rather homely image. "A whole bunch of things ought to be loose, and a whole bunch of things ought to be tight; the trick is to figure out how to sort things into those two piles."

Kapor seeks an almost Zen-like balance between seemingly opposite values like people and profit, informality and organisation, process

and ambitious goals. He is not searching for one answer to a problem; he's committed to an ongoing process. As long as Lotus endures, it will be changing, and its people will have to keep re-adjusting the balance.

Kapor wants Lotus to endure for a long time. One key to endurance is pacing. When the managerial team meets to establish priorities for the coming period, "we make a list of the five things we will do during this period and a list of the five things we will not do," Kapor says. This strategy not only sets up reasonable expectations, it focuses on specific targets. By focusing their priorities and pacing their work schedules, Lotus employees improve the quality of their work.

Another requirement for endurance is that the founder's personal beliefs be built into the corporate culture, making them distinct from himself and self-perpetuating. An important step in achieving this is through hiring practices. Lotus carefully seeks out managers who are comfortable working in the company's open, collaborative system. These people, in turn, hire kindred spirits.

Maintaining a flexible, innovative posture is essential in a fast-growth industry. When the company had 30 employees, it was very much like a family. A year later, when it had 300 employees, the family model was no longer workable.

Yet, says Kapor: "People still know what they're doing, why they're doing it, and how what they're doing fits into what the company is trying to achieve as a whole. One of the things that makes the Lotus approach what it is is that we pay attention to things like 'the Lotus approach'. That is, how things get done as opposed to merely getting them done."

Making the process as important as the product affects more than the internal workings of Lotus. The company's philosophy is reflected in its software. "There's a consistency between the values and style I talked about in the company and the values and style embodied in the product," Kapor says.

Kapor reaches for the function key template that was designed for 1-2-3. "We tried to think through how Lotus people were going to use not only our product but their computer. Some people have replacement keycaps.

"That's no good because it makes it difficult to use other programs. Other people have cardboard or paper slips. But they tend to fall off and get lost, which defeats the purpose. So we went for an injection-molded plastic piece that slips on but, because of the little indentation, rests securely and can't accidentally become dislodged. It's useful, but also easy to pick up and take off. Multiply this example by a hundred and you can see what goes into designing a product."

Even in marketing, where Lotus is as aggressive as they come, Kapor sticks to his philosophical guns. "Marketing is about creating perceptions," he says. "I think those perceptions should be directly linked to the actual value we deliver, not to ethereal images."

The bottom line

Mitch Kapor is not the first entrepreneur to believe that it's possible to run a business that is both good to its people and profitable. He does, however, seem to be among the blessed who have managed to succeed on both fronts.

Lotus is making lots of money. In its first public offering of common stock last October, the company raised more than \$US34 million. With its second generation product, Symphony, it hopes to beat the curse of the single-hit software company.

"I know this is a place where people like to work," beams Kapor over what seems to be his own most gratifying achievement. He insists that this is because of the way things are run, not just to the current high roll of the company. "It's got to be fun," he says. "It's got to be stimulating. Not just for me but for everybody."

"There's no magic to it," he says. "Just take one or more bright ideas and figure out how to get the job done with the right set of people. And there it is. It's simple."

SYMPHONY IN FIVE MOVEMENTS

The people at Lotus Development Corp knew all too well that their tremendously popular Lotus 1-2-3 would be a hard act to follow. Yet they have not only followed Lotus 1-2-3, they may have eclipsed it. Symphony, a new integrated package, squeezes word processing, data management, communications, spreadsheet and business graphics programs onto a single 320K-byte disk. Symphony not only integrates five applications but does so with a windowing environment that rivals VisiCorp's Visi On.

Like Lotus 1-2-3, Symphony responds both to the novice's fumbling and to the imagination of a spreadsheet veteran who is comfortable with macros and sophisticated financial models. The package is flexible and expandable. Lotus has left open 10 interfaces to the program, so that software developers can link their programs (such as spelling checkers, other graphics packages, and the like) to Symphony and enhance an already sophisticated product.

The word processor includes advanced features such as automatic word wrap, global search and replace, and automatic pagination, plus boldface and subscript printing options. It also allows you to edit documents immediately (without a separate formatting step) when they are received via telecommunications.

The data management system uses a simple, forms-oriented method of entering data and can store more than 8000 records. The data management features work in concert with Symphony's word processor to perform mail merge

functions. The data management system's report generator can produce formatted output such as mailing labels, inventory reports, invoices and form letters. You can sort up to three data fields simultaneously. For example, you could retrieve and print all records filed under the surname Robinson from Victoria with the Postcode 3043.

Symphony's asynchronous communications package includes terminal emulation (most ANSI-standard terminals and partial VT-100 emulation), point-to-point file transfer, and automatic dial and logon to remote computers. You can suspend a session, analyse the transmitted data, and immediately return to communications without breaking the connection.

With its 8192 rows and 256 columns, Lotus's spreadsheet successor to Lotus 1-2-3 is the largest spreadsheet available for the PC. Its most significant advantage over Lotus 1-2-3 is its ability to manipulate text as well as numeric information in spreadsheet models. The new spreadsheet can use most worksheets developed on Lotus 1-2-3.

Symphony's business graphics provides eight graph types, including shaded and exploded pie charts, area charts, open/high/low/close charts (for displaying stock market information), X-Y graphs, and line, bar, and stacked bar graphs.

Despite the package's seeming complexity, Lotus has made good on its promise to keep things simple. The word processor, for example, uses straightforward commands. The database automatically creates the basic file structure, requiring only that the user enter the list of items desired.

The help file contains more than 200 information screens. Since this 320K-byte program resides entirely

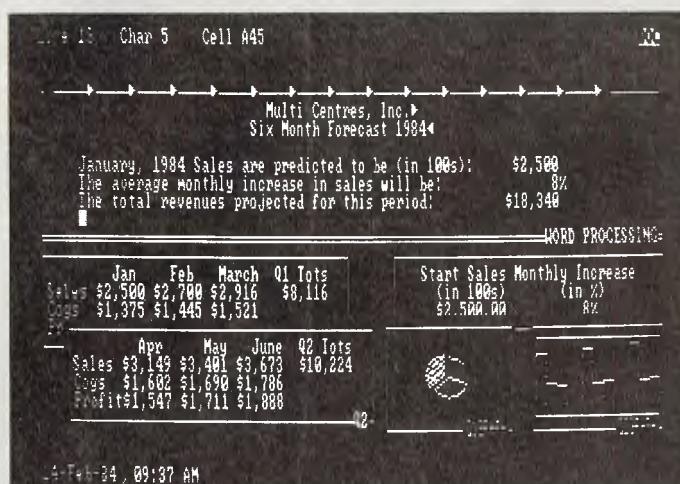
in user memory, Symphony is extraordinarily fast and efficient.

But the real power of Symphony is in its integration capabilities and its overlapping windowing environment. Tables or database information can be inserted easily into documents prepared with the word processor.

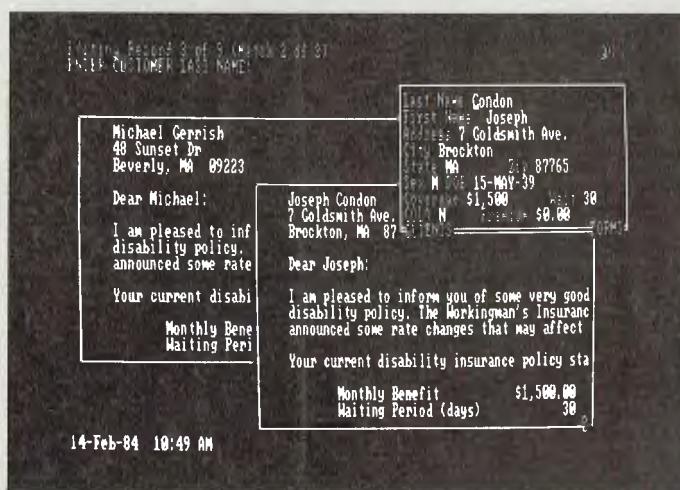
Changes to one window will automatically update windows from other applications that are affected. At a demonstration of Symphony I attended, stock market figures coming in over a modem were

displayed in one window while a portfolio displayed in another was automatically updated. With a couple of easy moves, a third window could be set up to represent the changing figures graphically.

Symphony was scheduled for shipment in July and will carry an introductory price of \$US695. For \$US200, registered Lotus 1-2-3 owners can trade in their package for Symphony. Of course, Lotus Development will continue to sell and service the ever-popular Lotus 1-2-3.



Symphony's window management allows a user to view various functions simultaneously. This screen shows word processing, three spreadsheets and two graphs.



Two word processing windows and a database window.

PARITY COMPUTER LTD

Parry Thomas and David Reading established Parity as a supplier of contract programming services in 1978. Parity developed into a computer services company, offering recruitment project management and consultancy services as well as contract programming. Parry Thomas says that their computer services turnover should exceed \$7 million this year.

In 1979, Parity started to become interested in the opportunities offered by the microcomputer. When the IBM PC became available in 1983, Parity became a dealer. Since then, the company has become one of the most aggressive PC dealers in Australia. The company has become successful in the corporate market and claims to have sold 10 per cent of all PCs in Australia. Parity wants to be the biggest and best PC supplier in Australia, aiming for 20 per cent of the market. Parry Thomas claims their PC sales this year will top \$10 million.

Parity has a strategy to achieve its aims based on a combination of the US super dealer approach and franchise satellite stores, developed by some of the US franchise computer store companies. To enable Parity to raise the capital needed to support its expansion plans, a public unlisted company, Parity Computer Ltd, last year raised \$5 million and bought Parity Computer Pty Ltd. Insurance company Aetna bought a small shareholding in the new company. Parry Thomas says he expects the company will have to continue to raise more capital to support its growth. He expects a turnover for the company of \$40 million in 1984/85 and he would eventually like to take Parity public.

Parity has been able to compete in the corporate PC market using its mainframe experience as a computer services company and its branches in Sydney, Melbourne, Canberra and

Brisbane. Parry Thomas sees the ability to provide national support as the key to success in the corporate market. He hopes to establish branches in Adelaide and Perth but says he would rather acquire an existing dealer than establish another branch office.

As well as the corporate desktop market, Parity has been active in another corporate market that is not often recognised as an important microcomputer market. This is the supply of large numbers of systems running a standard management package to companies that have many retail outlets.

Parry Thomas says that these systems require the development of a solution in conjunction with a corporate client. Dealers who want to compete for this business must be able to provide a high level of development support as well as to support the sale, installation and service of the PC, he says.

Parity also sells PCs to small business. Its approach is to offer solutions for particular applications. Parry Thomas says the company's strategy is to acquire or develop packages in a particular market segment that can be sold as solutions. Parity is involved with the Aetna developed Assure package for insurance agents and is looking at medical and share management packages.

The other part of the strategy is based on Businessland, the US-based computer store franchise. The concept is based on franchise showrooms backed by a central warehouse. The showrooms are solutions oriented — similar in concept to car showrooms. When the system is sold, it is delivered and installed from the central warehouse rather than from the showroom. Parity will open its first showroom in St Leonards, Sydney, later this year.

Parity doesn't want to become involved as an agent for software.

The company recommends standard software packages, sourcing them from Australian distributors. Parity's choices include Lotus, MultiMate and the accounting packages from IAL, Attache and Sybiz. Special applications are developed using the South African code generator Generex. Using Generex, an application can be developed, specified and verified by the client very quickly. When the application is stable, it is recoded using the Generex code as the specification.

Parity is also involved with the HP-150 microcomputer and supports the Eagle Spirit portable as its portable PC until IBM's portable becomes available. Parry Thomas says that he would love to sell the 3270-PC and sees it as an important part of corporate microcomputing that dealers serious about the corporate market will need.

During the PC shortage, Parry Thomas says they imported about 250 systems from Europe, but supply from IBM had now improved considerably. The way to work with IBM is to understand their methods and to build a good working relationship with them, he says.

SYDNEY

472 Pacific Highway
St Leonards 2065.
Tel: (02) 438 3222.

MELBOURNE

424 St Kilda Rd
Melbourne 3004.
Tel: (03) 267 6844.

CANBERRA

2 Lyell St
Fyshwick 2609.
Tel: (062) 80 6444.

BRISBANE

159 Coronation Drive
Milton 4064.
Tel: (07) 229 2216.



1984 WORLD CLASS PC AWARDS

*Australian PC World readers vote
for their favorite
IBM PC compatible products in
12 hardware and 18
software categories.*

**WIN THE WORLD CLASS PC
SOFTWARE COLLECTION
WORTH MORE THAN \$3000**

Australian PC World is proud to announce the 1984 World Class PC Awards. Readers will vote for their favorite IBM PC compatible products in 12 hardware and 18 software categories. The winning products plus an IBM PC constitute the 1984 World Class PC.

Australian PC World asks readers to help design this year's World Class PC by voting for PC compatible products in the categories listed on the contest entry form. Choose one product in each of the categories you are familiar with that you would recommend to a friend for outstanding performance and value.

The product that gains the highest number of votes in each category will receive *Australian PC World*'s 1984 World Class PC Award. The reader who correctly estimates the retail value of the 1984 World Class PC software collection as at June 1, will win all of the packages in this collection. If a correct estimate is not received, the software collection will be awarded to the reader whose estimate is closest to the correct answer. In the event of a tie in value estimates, the prize will go to the entrant whose nominated list of products most closely matches the World Class PC. If a further tie occurs, the prize will be awarded on the basis of neatness.

The *Australian PC World* World Class PC Awards will be announced in the November issue of the magazine.

Several of the software

categories are defined here to help readers place their votes. The other categories are self-explanatory.

Accounting

Order processing, inventory, accounts receivable and payable, cheque writing, payroll, general ledger, management reports.

Business management

Project and appointment scheduling, statistical analysis, decision analysis, personnel records, sales prospect management.

Education

Classroom subjects, training on applications software such as word processing.

Financial applications

Investment analysis, portfolio management, stock information retrieval, financial calculation, planning, and reporting.

Operating environments

Window-oriented software systems designed to integrate any number of applications programs.

Personal management

Household record keeping, personal finances, personal data management.

Spreadsheets

Includes programs that integrate other functions, such as graphics or word processing.

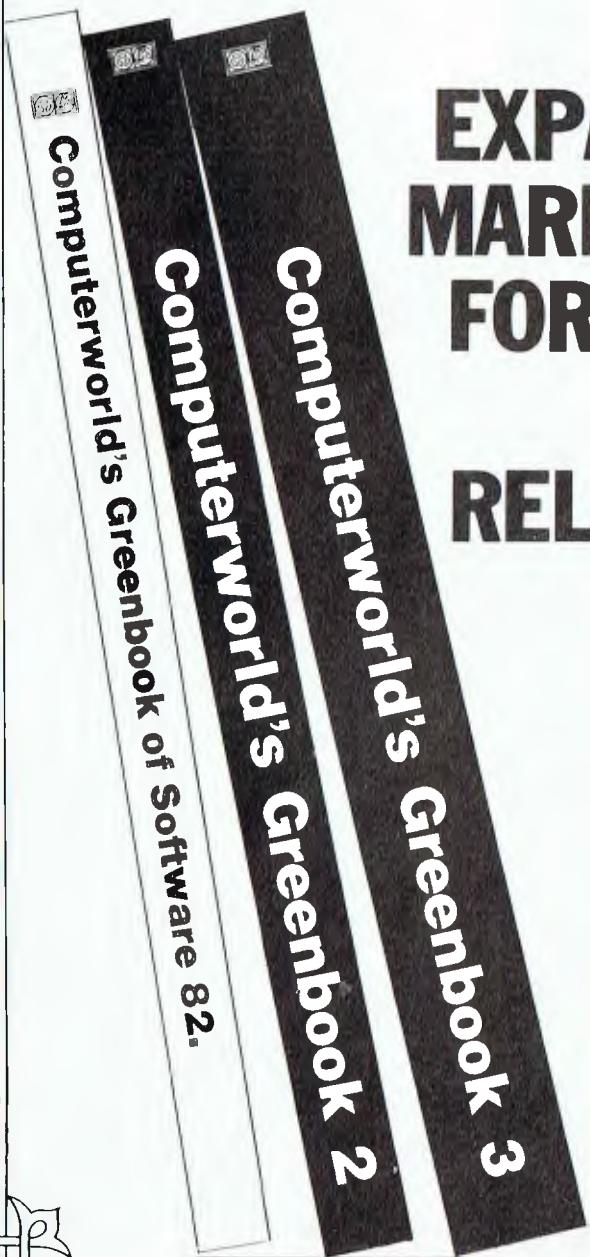
Remember to vote for products that you would recommend to a friend, which means performance and value are equally important considerations. After all, you may win the system you help to create.

FOR YOUR ATTENTION

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Name of Company

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Tel:

Are you a subscriber to Computerworld?

Yes

No

PC USERS AROUND AUSTRALIA

Despite the threat of power cuts and the bleak overcast weather that only Melbourne could provide, the June meeting of MELB-PC was reasonably well-attended.

Amid the dimly-lit Auditorium No.3 at Clunies-Ross House (kindly loaned by the Australian Computer Society), 40 or so intrepid members of Melbourne's PC user community were treated to a demonstration and lecture on PC-based expert systems.

Robert Longair, an audit consultant with Pannell Kerr Forster's Melbourne office, explained the principles behind so-called expert (or knowledge-based) systems, and their potential and limitations as decision support tools. He then staged a hands-on demonstration, using a simple bread-making expert system, created earlier with the ESP Advisor package (currently only available from the UK).

An interesting point raised during the discussion was the fact that several scientific-based expert systems have track records that are more reliable than their human counterparts (the MYCIN system for example). So perhaps it is not just assembly-line workers who will be put out of jobs by computers in the future. Several large corporations in the US are apparently gathering up all their experts close to retiring age, and locking them away in hotel rooms for weeks, with expert system generation programs and operators

(known as 'knowledge engineers'), to pick their brains before the expertise becomes lost.

Meanwhile, back to the more humble world of the PC. The large collection of available PC public domain software continues to grow, with the IBM-PC Users' Group of South Australia claiming to have more than 70 volumes available. Other user groups going strong are the ACT and Illawarra groups (details are listed at the end of this column).

The ACT PC users' group has about 80 members and caters for anyone interested in 16-bit microcomputing. Members have a wide variety of systems and much of the group's initial software efforts have been directed at developing conversion programs for the movement of software between the CP/M-86 and MS-DOS operating systems. The first public domain disk released by the group contains the first of these programs and the group intends to convert useful CP/M public domain software across to MS-DOS.

At last it seems a sleeping giant is beginning to awake; interest has been expressed in forming a Sydney-based PC users' group. With an inaugural meeting scheduled for 6pm on 30th July at the O.T.C. Conference Room in Martin Place, this group is expected to grow rapidly. So far there has been no organised PC user activity emerging from either Perth or Hobart, but hopefully this situation will eventually be rectified.

PC USER GROUPS

MELB-PC

Address: c/o Pannell Kerr Forster, 500 Bourke St, Melbourne 3000
Contact: Chris Leptos (03) 605 2222
Meetings: Clunies-Ross House, 191 Royal Parade, Melbourne, 5.30pm, third Wednesday of month.

IBM-PC Users' Group (SA)

Address: P.O. Box 68, Walkerville, SA 5081
Contact: Don Richards (08) 261 9590
Meetings: 173 Wakefield St, Adelaide (or as advised in PC News) 7.30pm, first Thursday of month.

ACT PC Users' Group

Address: P.O. Box E188, Queen Victoria Tce, Canberra 2600
Contact: Mark Proctor

The Illawarra IBM-PC Club

Address: P.O. Box 77, Port Kembla N.S.W. 2505
Contact: Ken Jeffrey (042) 74 0422
Meetings: John Lysaght Springhill Training Centre 7.30pm, first Tuesday of month.

Sydney PC Users Group

First meeting: 6pm, Monday July 30, Conference Room, OTC House, Martin Place, Sydney.

Further information: Ian Robinson, Tel: (02) 439 5133.

LOTUS ASSOCIATION EXPANDS

Spurred on by news of the expansion of Lotus Development Corp's Australian distribution channels and the imminent release of the Symphony package (scheduled for mid-July), Lotus user activity in Australia continues to rise. So much is happening in this area that Australian PC World now contains a separate section to monitor and support the Australian Lotus user community.

The Lotus 1-2-3 Users Association conducts monthly meetings in Sydney, Melbourne, Adelaide and Brisbane and also produces a monthly newsletter. Membership costs \$15 a year (with a \$5 joining fee) and application forms are available from any of the addresses at the end of this column. Although this may appear a rather obvious plug, it is refreshing to see a user group so organised after relatively few meetings, and one that is co-ordinated nationally.

Following the recent visit by Lotus Development Corp representatives Chuck Digate and Eric Bedell, who met with Association committee members, the company has re-expressed its commitment to support user groups. Because of this commitment, principal Lotus Australian distributor, Imagineering, will establish a special Lotus "hotline" for Lotus 1-2-3 and Symphony users.

The Association's June meetings covered a diverse and detailed range of subjects, and July promises a line-up just as interesting, if not better. The Melbourne group held its first meeting at a new venue, the Light Car Club at 46 Queens Road, and the full bar and dining facilities went down well with members.

One topic discussed was the use of Lotus 1-2-3 as a theatre booking system, with each spreadsheet cell representing a theatre seat. The members were also treated to demonstrations of the Portable PC and the Chameleon running Lotus 1-

2-3. Melbourne president Robert Taylor claims that attendances continue to grow, but hopefully they will not outgrow the limits of the new venue.

Meanwhile, back in Sydney, representatives of both Imagineering and Sourceware attended. Members were not quite sure what to expect. Although both parties claimed to be the best of friends, the long-term results of Lotus' new distribution arrangements remain to be seen.

Imagineering's Madeline Long briefly explained the new structure, and detailed the increased technical support planned for Lotus users. Sourceware's George Westwood spoke exhaustively on the details of Symphony, which he had the good fortune to preview during a recent visit to the US. John Keen of Hewlett-Packard gave an interesting talk on the effective use of graphics, followed by a short plug for the new HP briefcase portable (which has Lotus 1-2-3 built into ROM). Keen also claimed that an HP-150 version of Symphony was scheduled for release in September.

The meeting was well-attended, with more people than chairs. Perhaps the Sydney group may have to consider a larger venue.

The Sydney meeting ended around 8.30pm, with the usual hard core moving on to the local Chinese restaurant. (Not the Lotus Blossom).

The Adelaide group also discussed graphics, and was given a demonstration of the eight-pen Roland DX4-800 plotter. As with the other groups, membership and meeting attendances continue to grow.

An encouraging turnout attended the first Brisbane Lotus User Group held on June 19. Hopefully, it is only a matter of time before further user groups spring up in Perth and Canberra, as the numbers are definitely there and support is readily available.

LOTUS USER GROUPS

Sydney

Address: GPO Box 5010, Sydney 2000. Contact: Ron Pollak. Telephone: (02) 290 3655. Meetings: 7th Floor, 6-18 Bent St, 5.45pm, first Thursday of month.

Melbourne

Address: PO Box 4720, Spencer St, Melbourne 3001. Contact: Robert Taylor. Telephone: (03) 267 4800. Meetings: Light Car Club, 46 Queens Rd (cnr Roy St), 5.30pm, first Tuesday of month.

Adelaide

Address: GPO Box 1969, Adelaide 5000. Contact: Paul Wragg. Telephone: (08) 223 5711. Meetings: 173 Wakefield St, Adelaide. 7.30pm, first Tuesday of month.

Brisbane

Address: PO Box 24, North Quay, Queensland 4000. Contact: Bill Savage. Telephone: (07) 221 2144. Meetings: (Duesbury's) 30th Floor, 239 George St, Brisbane. time and date to be determined.

USERS EXCHANGE PERSONAL COMPUTER DISCOVERIES

STAR-DOT-STAR provides a forum for users to share their PC discoveries. Australian PC World will pay \$20 for each PC program, technique or patch published. Send them to:

Star-Dot-Star
Australian PC World,
PO Box 929,
Crows Nest 2065.

No-REM remarks

I stumbled on one of DOS's quirks, which can be put to good use. It seems that DOS will ignore any command that starts with a period. This can be used to add batch file remarks that will print on the screen more cleanly than the standard REM function.

To create a short test batch file, type:

```
copy con: test.bat.<ENTER>
.This is a test. <ENTER>
Look Ma, no REM statements! <ENTER>
.That's all, folks. <ENTER>
<Ctrl-Z> <ENTER>
```

Now run it by typing "test" from DOS.

Kevin Scoot
Boise, Idaho

Fortran vs. Basic

We have performed a benchmark test using Fortran and Basic on several computers. The program was a simulation of the dynamics of a "floating-ring seal" used in high-speed turbomachinery.

This is a typical scientific/engineering application that involves considerable number crunching. The motivation here was to assess the speed of the PC when it is used for engineering or scientific applications, and to compare

it with other personal and mainframe computers. All tests were performed in single-precision. The results are shown in Figure 1 (numbers in parentheses indicate timing with the Intel 8087 coprocessor and appropriate libraries).

In a further test we ran the NBS Methane properties package on the IBM PC under Fortran 3.03. Execution time was 16.5 seconds without the 8087, and 2.5 seconds with the 8087. A time of 90 seconds was obtained for this program on the Xerox 820.

Both the original IBM release of Microsoft Fortran and the new 3.03 version are practically as slow as the 8-bit Fortran of the Xerox 820.

The Basic Compiler with the 8087 does not achieve anything like the speed improvement that Fortran does. Whether this is due to inefficiencies in the Micro Ware Basic 8087 library or to problems

with the Basic Compiler itself is an open question.

Jim Glass
Chris Landis
Source mail

Stop step

The instructions in Listing 4 explain how to insert STOP commands between each line of a Basic program, thereby making it easier to debug the program, and how to remove the STOP commands.

Press F9 continuously until the automatically generated line numbers exceed the highest line number of your program. Then press Ctrl-Break to exit from the automatic line number generator mode.

Run the program. The program executes one line at a time, enabling you to examine all intermediate results and discover any errors. Correct the errors, adding new line

Machine	Language	Seconds
CDC-176	FORTRAN	0.8
IBM 3033	FORTRAN	1.63
UNIVAC 1100/83	ASCII FORTRAN	12.00
TEKTRONIX 4081	FORTRAN	196.00
PDP-11/34	FORTRAN	94.00
IBM PC	BASIC Compiler	866.00
Xerox 820	FORTRAN	3384.00
		(773)*
IBM PC	IBM FORTRAN (original)	4440.00
		(1711)*
IBM PC	FORTRAN 3.03	3284.00
		(585)**
IBM PC	BASIC Interpreter	11935.00
Apple	BASIC Compiler	5153.00
Apple	BASIC Interpreter	16937.00

* Using MicroWare 8087 Library
** Using Microsoft 8087 Library

Figure 1: Benchmark test of Fortran and Basic languages.

```

LOAD "PROGRAM"
RENUM 10,10
KEY 9, "STOP"+CHR$(13)
AUTO 15,10

```

'to renumber the line numbers beginning with ten and incrementing by ten.
'defines the function key.
'generates line numbers automatically beginning at fifteen and incrementing by ten.

Listing 1: Inserting Basic STOP commands.

numbers if needed, but do not add any line numbers that end with 5 (such as 15, 25, 35, or 45). Then press F5 to continue.

If you have previously redefined F5 to its original setting, then define it as follows:

KEY 5, "CONT" + CHR\$(13)

If the line that the program stops at prompts you to input data, do so. If the program stops but gives no prompt and doesn't respond with 'Break in (line x)', you have probably encountered a line with the INKEY statement.

To continue, press the appropriate key. When the response on the screen is 'break in (the line number)', you may use the LIST command (perhaps to determine which variables are in the line on which the program execution was broken). Subsequently, you can have the value of the variable printed (PRINT Varname) or add new line numbers.

Finally, press F5 to continue beginning with the next line following the line at which the program execution was broken. But, with some changes to your program, you may not be able to continue by pressing F5. If the computer responds with 'Can't continue', you will have to rerun the program.

To remove the STOP commands, type:

AUTO 15, 10

Hold down the Enter key until the automatically generated line numbers either exceed the highest line number of the program or are no longer followed by an asterisk. Then press Ctrl-Break.

If you wish to debug again with the present program in memory or with another program, you don't need to include the statements that define the function keys (such as Key 9).

Here is the entire procedure, without explanations:

```

LOAD "PROGRAM"
RENUM 10,10
KEY 9 "STOP" + CHR$(13)
AUTO 15,10
(F9)
(Ctrl-Break)
RUN
(F5)
AUTO 15,10
(ENTER)
(Ctrl-Break)

```

Gary Goldstein,
Tampa, Florida.

Poor person's word processor

If you want to write a short note or letter and don't care about saving it to disk, you don't need a word processor — or DOS for that matter. Just turn on the computer and let Cassette Basic take over.

Type **KEY OFF (ENTER)** to turn off the line 25 display. Then press Ctrl-Home to clear the screen. You're now ready to compose your letter. You can use Tab, Backspace, and any of the four cursor control keys, plus the Ins and Del keys, for editing your letter.

The only precaution is that, when you want to skip to a new line, you must use Ctrl-Enter. If you just press Enter, you'll get a Syntax Error message.

Once you have composed your letter using as much of the screen as

you need, turn on your printer and press Shift-PrtSc to print the letter. Repeating Shift-PrtSc allows you to make multiple copies.

If you accidentally press Enter without Ctrl, you can repair the damage using the editing keys. Remember that your entire letter is a kind of string, and that too many inserts and deletes will require editing to correct the rest of the display.

T. R. Dickson,
Aptos, California.

Basic print screen

When Basic is running on the PC, the DOS Print Screen Function (Shift-PrtSc) is not available.

There is a way to do a Print Screen function from within a Basic program that will work regardless of memory size. Put the following subroutine at the end of your program:

```

60000 PRTSC$ = CHR$(205) + CHR$(5) +
CHR$(203)
60010 PRTSC = VARPTR(PRTSC$)
60020 PRTSC = PEEK(PRTSC + 1) + 256 *
PEEK(PRTSC + 2)
60030 DEF SEG
60040 CALL PRTSC
60050 RETURN

```

The following line will print the contents of the screen:

100 GOSUB 60000

Programmers who call machine language routines from their Basic programs should note that this subroutine resets the current segment to Basic's data segment.

Robert Pirko,
New York.

Flip lock

One of the most conspicuous failings of the PC keyboard is the lack of indicators regarding the status of the CapsLock and the NumLock keys.

Why else would people keep trying to come up with the definitive way of correcting the problem? If you're willing to type 384 bytes worth of data

statements, you can create a DOS.COM file to do the job.

Listing 2 is a Basic program that creates a program file called FLIP.COM. Enter the program while in BasicA to make it run.

After entering line 340, be sure that the DOS disk is in drive A and that the write-protect tab is removed.

Then either press F2 or type RUN (ENTER).

If a message appears saying 'Checksum error; verify data statements', a mistake has been made entering the numbers in lines 260 through 286. Otherwise a new file will have been created on the DOS disk called FLIP.COM.

Now go back to DOS by typing

SYSTEM (ENTER)

and run the new program. It can be used by entering any of the following command lines:

FLIP CAP ON sets keyboard to uppercase letters.

FLIP CAP OFF sets keyboard to lowercase letters.

FLIP NUM ON sets numeric keypad to numbers.

FLIP NUM OFF sets numeric keypad to cursor control keys.

FLIP MONO changes default monitor to the monochrome display.

FLIP COLOR 40 changes default monitor to a 40-column color graphics display.

FLIP COLOR 80 changes default monitor to an 80-column graphics display.

Now you might say that it's easier to reach over and press the CapsLock or Numlock key than to type in this command. That may be true, but you still have to remember to do that.

By including these commands in an Autoexec.bat file, the computer will remember to do that procedure for you. The procedure to set up an Autoexec.bat file is covered on pg 2-16 of the DOS manual.

Remember that this will work in DOS only. To do the same thing in BasicA you need to include the lines in Listing 3 in your Basic programs (they may be included near the beginning of your program or as a GOSUB routine elsewhere in the program).

Tom Foth,
Madison, Wisconsin.

```

10 REM
20 REM This program makes the DOS command FLIP ---
30 REM
40 REM Copyright (c) 1982 Thomas J. Foth
50 REM Permission granted to copy and distribute this source with
60 REM inclusion of this notice but not for profit
70 REM
80 REM Author makes no warranty, expressed or implied, as to
90 REM the correct nature and operation of this software.
100 REM
110 REM Command syntax
120 REM
130 REM FLIP |NUM | |ON | - Flip numeric pad on or off
140 REM |CAP | |OFF| - Flip caps lock on or off
150 REM or
160 REM FLIP |MONO | - Flip to monochrome adapter
170 REM |COLOR| |40| - Flip to color adapter in either 40 or
180 REM |80| 80 column mode
182 REM
182 REM
190 FOR I = 1 TO 258 : READ N : C = C + N : NEXT
200 READ N : IF N <> C THEN 330
210 RESTORE : OPEN "R", #1, "FLIP.COM", 1
220 FIELD #1, 1 AS NS
230 FOR I = 1 TO 258: READ N: LSET NS=CHR$(N)
240 PUT 1:NEXT:CLOSE
250 END
260 DATA 184, 64, 0, 142, 216, 179, 64, 190, 93, 0, 191, 203, 1, 185, 3, 0, 252, 243, 46, 166
262 DATA 131, 249, 0, 116, 19, 179, 32, 190, 93, 0, 191, 206, 1, 185, 3, 0, 243, 46, 166, 131
264 DATA 249, 0, 117, 44, 190, 109, 0, 46, 161, 198, 1, 38, 59, 4, 116, 26, 190, 109, 0, 191
266 DATA 200, 1, 185, 3, 0, 243, 46, 166, 131, 249, 0, 117, 44, 128, 243, 255, 32, 30, 23, 0
268 DATA 205, 32, 8, 30, 23, 0, 205, 32, 190, 93, 0, 191, 209, 1, 185, 4, 0, 243, 46, 166
270 DATA 131, 249, 0, 117, 25, 128, 14, 16, 0, 48, 184, 7, 0, 205, 16, 205, 32, 186, 222, 1
272 DATA 140, 200, 142, 216, 180, 9, 205, 33, 205, 32, 190, 93, 0, 191, 213, 1, 185, 5, 0, 243
274 DATA 46, 166, 131, 249, 0, 117, 226, 190, 109, 0, 46, 161, 218, 1, 38, 59, 4, 117, 8, 177
276 DATA 32, 187, 2, 0, 235, 15, 144, 46, 161, 220, 1, 38, 59, 4, 117, 197, 177, 16, 187, 0
278 DATA 0, 176, 207, 34, 6, 16, 0, 10, 193, 162, 16, 0, 139, 195, 205, 16, 205, 32, 79, 78
280 DATA 79, 70, 70, 67, 65, 80, 78, 85, 77, 77, 79, 78, 79, 67, 79, 76, 79, 82, 56, 48
282 DATA 52, 48, 10, 13, 70, 76, 73, 80, 32, 105, 103, 110, 111, 114, 101, 100, 58, 32, 73, 110
284 DATA 118, 97, 108, 105, 100, 32, 112, 97, 114, 97, 109, 101, 116, 101, 114, 10, 13, 36
286 DATA 24871
330 PRINT "Checksum Error: verify data statements"
340 END

```

Listing 2: Basic FLIP.COM creation program.

```

800 `START NUMERIC SHIFT
900 DEF SEG=&H40:B% = PEEK(&H17)B% = B% OR &H20:POKE &H17, B%
905 `START UPPER CASE SHIFT
910 DEF SEG=&H40:B% = PEEK(&H17)B% = B% OR &H40:POKE &H17, B%
915 `RESTORE CURSOR MOVEMENT SHIFT
920 DEF SEG=&H40:B% = PEEK(&H17)B% = B% AND &HDF:POKE &H17, B%
925 `RESTORE LOWER CASE SHIFT
930 DEF SEG=&H40:B% = PEEK(&H17)B% = B% AND &HBF:POKE &H17, B%
935 `SWITCH TO 40 COLUMN COLOR
940 WIDTH 80:DEF SEG=0:A=PEEK(&H410):POKE &H410,(A AND &HCF) OR
&H20:WIDTH 40:SCREEN 1:SCREEN 0:LOCATE,,1,6,7
945 `SWITCH TO MONOCHROME DISPLAY
950 WIDTH 40:DEF SEG=0:A=PEEK(&H410):POKE &H410,A OR &H30:WIDTH
80:LOCATE,,1,12,13

```

Listing 3: Flip lock code for Basic programs.

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• The Zenith ZTX-10 ASCII Personal Terminal features an RS-232 port and offers decision makers and information processors instant and user-friendly access to all computers.

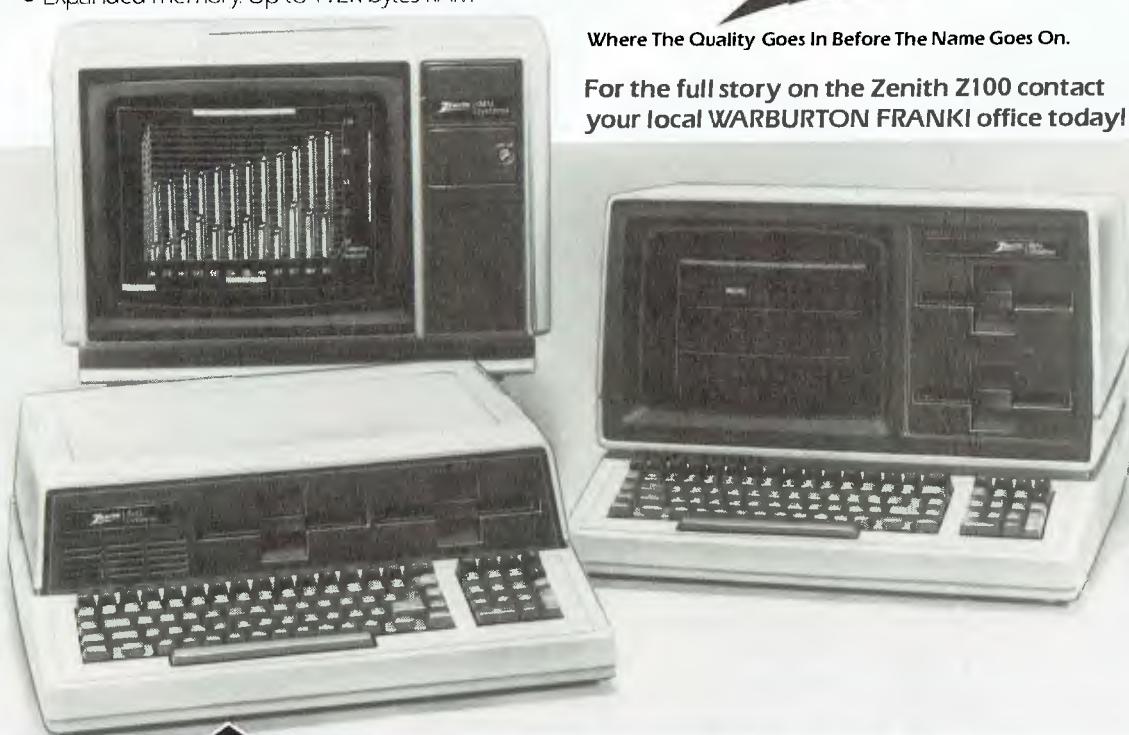
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Q-String

The need for this routine became apparent as I was developing a large interactive Basic program with many screen menus. There were many points in the program at which the user was asked to input information and I wanted to find the most foolproof way of getting that information.

The most elementary way to get data in Basic is with the INPUT function, but it has some severe shortcomings. If users try to make use of the Backspace key, they can backspace their way right over the input prompt.

Furthermore, if there is any information on the screen to the right of the input prompt, the backspacing will drag that information, corrupting the screen. The INPUT function doesn't restrict the use of the up or down cursor keys either, creating a situation in which users can wander

anywhere on the screen and get totally disoriented.

The program I was developing placed some other burdens on INPUT capabilities. The information the user would enter might include various control characters (with ASCII values from 0 to 31).

But some of these control characters cause catastrophic screen events. For example, if you type a Control-L (ASCII 12) as part of your input, it will clear the screen.

A third problem would be caused if the user needed to include a carriage return (ASCII 13) as part of the entered information. When you press the Enter key (or type Control-M), the Input function interprets that as the completion of the entry.

All these problems are solved by the routine Listing 4 which I call Q-String. The actual subroutine is contained in lines 60000 to 60190 of the listing; lines 2 to 330 set up a test

screen and show how the subroutine can be implemented.

The subroutine returns a string variable named Q\$. Before going to the subroutine, you can set a maximum length for Q\$ with the numeric variable QL (see line 210). All the information is entered within the subroutine.

The routine, therefore, prints all control characters as their highlighted letter equivalents. If you add 64 to the ASCII value of a control character, you will get the ASCII value of its letter equivalent.

Finally, a provision is made for including carriage returns as part of the input. This routine lets the user indicate carriage returns with the backslash character (\); the conversion is made in line 60150.

Using the backslash for carriage return eliminates the possibility of including a backslash symbol as part of the string. The line could be left out or another character used as the substitute.

With all the filtering and converting taken care of, the keystroke is added to Q\$ at line 60160 and the user is sent back for another keystroke.

I've gone into detail describing these steps because they illustrate some of the possibilities available when dealing with string input in Basic.

Is implementing this subroutine worth it just to get an answer to a prompt? I think the initial programming effort pays off in terms of program reliability.

Once you have the subroutine coded, you can import it to any program. (I've chosen the high numbering scheme so that this routine won't get in the way of other program lines.)

You can get in and out of the subroutine with a single program line, as illustrated by line 210. I hope you find Q-String a useful tool for keeping your programs and your screen clean.

```

2 ' TEST PROGRAM TO DEMONSTRATE Q-STRING
4 ' (the actual subroutine begins at line 60000)
6 '
100 ' create a window on the screen
110 CLS:KEY OFF:FOR I=1 TO 10:KEY I, "":NEXT
120 PRINT"Input your data only within the box:
130 LOCATE 10,34:PRINT CHR$(201)+STRING$(10,205)+CHR$(187)
140 LOCATE 11,34:PRINT CHR$(186)+STRING$(10,32)+CHR$(186)
150 LOCATE 12,34:PRINT CHR$(200)+STRING$(10,205)+CHR$(188)
160 LOCATE 11,35,1
200 ' get input via the subroutine
210 QL=10:GOSUB 60000
300 ' use the input in the program
310 WHATYOUINPUT$=Q$
320 LOCATE 20,1:PRINT "You just input: ";WHATYOUINPUT$;
340 END
350 '
60000 ' Q-String Subroutine - Andrew Fluegelman
60010 ' Q$=string returned - QL=max permitted length of string
60020 '
60030 Q$="":IF QL=0 THEN QL=255
60040 QI$=INKEY$:IF QI$="" THEN 60040
60050 IF QI$=CHR$(13) THEN RETURN
60060 IF QI$<>CHR$(8) THEN 60090
60070 IF Q$="" THEN BEEP:GOTO 60040
60080 GOSUB 60180:Q$=LEFT$(Q$,LEN(Q$)-1):GOTO 60040
60090 IF LEN(Q$)=QL THEN BEEP:GOTO 60040
60100 IF LEN(QI$)=1 THEN 60130
60110 IF QI$<>CHR$(0)+CHR$(3) THEN BEEP:GOTO 60040
60120 QI$=CHR$(0):GOTO 60140
60130 IF ASC(QI$)>31 THEN PRINT QI$;:GOTO 60150
60140 COLOR 15:PRINT CHR$(ASC(QI$)+64);:COLOR 7
60150 IF QI$="\" THEN Q$=Q$+CHR$(13):GOTO 60040
60160 Q$=Q$+QI$:GOTO 60040
60170 '
60180 PRINT CHR$(29); " ";CHR$(29);:RETURN
60190 'end subroutine Q-String

```

Listing 4: BasicA routine for cueing operator input.

Timeout, timeout

In using the PC parallel printer port from Basic (DOS 1.10), timeout problems can occur if a printer with a large internal buffer is attached. This has been encountered while using a Mannesmann-Tally printer with a 4K-byte internal buffer; a similar problem might be expected with the new Epson line of printers.

Within BIOS the timeout interrupt is programmed to occur after an elapsed time of 20 seconds of non-response from the printer. This setting negates the spooling advantage to be gained from the printer's buffer.

But the problem can be overcome by altering the timeout parameter to a higher value. Since the pertinent code resides in ROM, a direct change could not be made in the existing code.

One solution is to reset the appropriate interrupt vector to point to an area outside the Basic work space (for example, the upper-most 115 bytes of high memory could be used), and PEEK/POKE the necessary code containing the desired modification into that area.

The Basic program in Listing 5 can be used to affect a timeout parameter change, permitting full use of the printer's internal buffer.

R.S. Parrish,
Athens, Georgia.

```
10  'Routine to modify the printer timeout value
20  'Currently in DOS 1.1, it is set to 20 seconds
30  '
40  'DEFINT I-N
50  NEWVALUE=60          'set value as desired
60  DEF SEG=&HF000        'peek at BIOS
70  DIM M(114):J=0
80  FOR I=&HEFD2 TO &HF044:M(J)=PEEK(I):J=J+1:NEXT
90  M(43)=NEWVALUE
100 DEF SEG=&H1E00        'poke into high memory of 128K system
110  FOR I=0 TO 114:POKE I,M(I):NEXT
120 DEF SEG=0            'alter interrupt vector
130  POKE &H5C,0:POKE &H5D,0:POKE &H5E,0:POKE &H5F,&H1
140 END
```

The WordStar WIP file

You can greatly improve the performance of WordStar by writing your text file on a RAM disk. If you are working on a long document and making use of extensive searches, block moves, and reformatting, the annoying delays caused by floppy disk access can be reduced to less than a second.

The problem, of course, is that you're in big trouble if there's a power glitch. Even if you have assiduously saved to disk with Ctrl-KS, your saved file is no more permanent than your power supply.

The following command sequence can be assigned to a key macro with a utility such as Keynote or ProKey. Giving this macro command will save your working file to a file on drive B called WIP (for work in progress) and return you to your present cursor position in the RAM disk text file.

'K1'QR'KB'QC'KK'KWb:wip <ENTER>

y'KH'Q1'K1

Some comments on the macro: 'K1 sets a place maker, 'QR moves to the beginning of the file, and 'KB marks the beginning of a block. 'QC moves to the end of the file and 'KK marks the end of a block. At this point the entire text file has been marked as one block.

^KWb:wip <ENTER>

writes the block to the file WIP on drive B. The letter y is necessary because, once the file B:WIP has been created, WordStar will ask you whether you want to overwrite it. The remaining commands erase the marked block, return to the place marker, and erase the place marker.

If you have assigned this macro command to a keystroke, such as Alt-S, it is executed very quickly with a RAM disk. You'll find this macro a convenient way to back up without breaking your work flow. Since the backup file is always called B:WIP, you do have to remember to save the file on disk under another name when your writing or editing session is completed.

A.F.

Basic key lines

A strange fluke in Basic and BasicA has been discovered. If a program tries to write on the 25th line (the key line) while the key values are displayed there, the program will fail.

A program must include a KEY OFF statement for information to be written to line 25. But the key line will not be displayed if you specify the program to execute from the DOS command line ('Basic progname').

Try these examples:

```
A>BASIC
OK
10 LOCATE 25.1:PRINT "Look ma, no keyline!"
SAVE"KL
RUN
Illegal function call in 10
OK
system
A>BASIC KL
Look ma, no keyline!
OK
```

Don O. Hoosatt,
Ft. Worth, Texas

Listing 5: Fix for DOS 1.1 timeout bug.

SYSTEMS

'New generation'

LAUNCHED at the recent Data 84 show in Sydney, the Monroe System 2000 is one of the "new generation" compatibles, incorporating an 8MHz 80186 processor and quad-density slimline disk drives (720K-bytes). The base model includes 128K-bytes of RAM, (expandable to 896K-bytes), two serial and one parallel port, a single disk drive, a battery-backed calendar clock, and five expansion slots. Expansion options include slimline fixed disk drives (10 or 20M-bytes) and a Z80A coprocessor card. List price is \$5464.

Further information: Pace Computer Services, 4 Help St, Chatswood, NSW 2067. Tel: (02) 411 7888.

Emtek-PC

THE Emtek PC from Emona Computers features serial and parallel ports, and a disk drive controller, all built in to the main system board. Externally, the Emtek-PC is identical to the IBM PC, apart from the slimline disk drives and Keytronics keyboard. MS-DOS version 2.00 is the only software supplied with the Emtek-PC. Available options include a 10M-byte fixed disk, a game controller and a Chinese character adapter. List price is \$3388.

Further information: Emona Computers Pty Ltd, PO Box K720, Haymarket, NSW 2000. Tel: (02) 212 4815.



Local assembly of the Pantek PC-16 will start in 1985.

The Italian jobs

OLIVETTI will manufacture more than 250,000 M24 and M21 personal computers by the end of this year to meet orders already taken. This figure is almost five times Olivetti's annual production for existing computer lines. Olivetti will soon announce a public launch date for the M24 PC in Australia. The company expects to sign up about 65 dealers to handle the product in Australia. The M24 runs under MS-DOS and Concurrent CP/M-86.

Further information: Olivetti Australia Pty Ltd, 140 William St, Sydney, NSW 2011.

Tel: (02) 358 2655.

Fox 2001

THE President Computer Group has released the Fox 2001 personal computer. The base model has eight onboard expansion slots, three of these taken up by the display adapter, disk controller, and multifunction card (which includes parallel and two serial ports, clock/calendar, and RAM expansion sockets). All system RAM is located on the multi-function card, which is claimed to make servicing and upgrading simpler. MS-DOS version 2.00 and the Perfect Series (Calc, Writer, Speller and Filer) are bundled with the Fox 2001 package. List price is \$3668 (green screen); \$3910 (color screen).

Further information: President Computers, 100 George St, Hornsby, NSW 2077. Tel: (02) 476 2700.

Datatel PCs

DATATEL has announced the release of a new series of PC-compatible integrated personal computers from Direct Inc of California. The Integrated Personal Computer (IPC) series is fully PC hardware and software compatible, and will communicate and exchange data with IBM, Digital Equipment, or Hewlett-Packard mainframes. Features include MS-DOS 2.0, 128K-bytes or 256K-bytes of internal memory, two RS232 asynchronous serial ports, one parallel printer port, a floppy disk controller, a real-time clock and calendar, an 8088 processor — and a socket for the 8087 coprocessor. The basic IPC comes in two configurations: Configuration A costs \$3661 plus tax and includes 128K-bytes of memory, two floppy disk drives and a monochrome monitor, while Configuration B costs \$5772 plus tax and includes a 10M-byte Winchester disk, 256K-bytes of memory, one floppy disk drive and a monochrome monitor.

Further information: Datatel Pty Ltd, 19 Raglan St, St Kilda, VIC 3205. Tel: (03) 690 4000.

Pantek

PANTEK Australia has released the PC-16 and PC-16-E personal computers. Bundled software includes the T/Maker III package, which combines word processing, list management and graphics. The base model PC-16 has 128K-bytes of RAM and two 360K-byte slimline disk drives, while the more expensive PC-16-E has a 10M-byte MiniScribe fixed disk and 256K-bytes of RAM. Both models have Keytronics-style keyboards and parallel and serial ports standard. The Pantek PCs are assembled in Taiwan and contain a system BIOS conforming to standards laid down by the Taiwanese government's ERSO committee. Assembly in Australia is scheduled for 1985, and nationwide maintenance is to be undertaken by Hills Industries Ltd. List prices are \$3610 (PC-16) and \$6429 (PC-16-E).

Further information: Pantek Australia Pty Ltd, 43 McCubbin St, Burwood, VIC 3125. Tel: (03) 288 6651.

PERIPHERALS

Protocol converters

DATATRAN has announced the release of the Avatar PA1000 and the Avatar PA1500 protocol converters in Australia. The PA1000 connects ASCII terminals and PC in all IBM environments, including BSC and SNA/SDLC. The converter uses a type-A coaxial cable connection and supports an RS232 interface on the terminal or PC. The PA1000 converter brings some personal computers into the IBM coaxial environment. It also allows single ASCII devices to access IBM and asynchronous host computers within a distributed environment. The PA1500 connects ASCII printers in all IBM environments, including BSC and SNA/SDLC. It uses a type A coaxial cable connection and supports both RS232 and Centronics parallel printers. The PA1500 connects between the ASCII printer and the IBM 3274/3276 or compatible cluster controller allowing channel attached or remote controllers supporting BSC, SDLC and SNA/SDLC protocols. The ASCII printer appears to the cluster controller as an IBM 3287 printer.

Further information: Datatrak Pty Ltd, 23 Waterloo St, Camberwell, VIC 3124. Tel: (03) 729 2844.

Printer range

MAGRATHS Electronics is supplying two Texas Instruments printers and a Japanese 80 char/sec dot-matrix printer in Australia. The TI 850 dot-matrix printer, which costs \$1063.75 including tax, prints at 150 char/sec. Enhanced print is 90 char/sec. The TI 850 has raster graphics capabilities, standard friction feed and handles 11in form widths. Serial and parallel interfaces are standard. The TI Model 855 dot-matrix printer produces 35 char/sec letter quality print and 150 char/sec draft copy. It comes with raster graphics, has serial and parallel interfaces and costs \$1408.75 including tax. The BMC DX-80 dot-matrix printer prints at 80 char/sec. It features superscript and graphics in character or bit image. The BX-80 has friction feed and built-in sprocket tractor and fits forms 10in wide.

Further information: Magraths Electronics, 55 A'Beckett St, Melbourne 3000. Tel: (03) 347 1122.



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North Sydney (02) 923 1266. Tlx: 23941.

PERIPHERALS

Onboard modem

DATANETCOMM has announced an onboard modem for the PC. The modem is an auto-dial slimline handset with Telecom Australia approved connection.

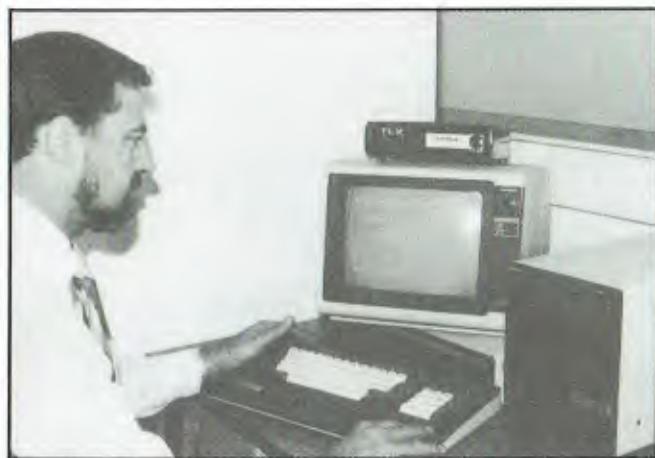
The modem complies to CCITT V.21 and V.23 standards which means it can transmit and receive at: 300 baud full duplex; 1200 baud half duplex; and 1200/75 baud (Prestel) full duplex. The modem supports synchronous connection to mainframe hosts for IBM 3270 bisync, IBM 2780/3780 BSC, IBM 3270 SNA/SDLC plus Burroughs, Univac, Facom, ICL and Honeywell. In synchronous mode, the modem is fully transparent to the data stream. The modem also supports asynchronous transmission for Dec, Wang, Prime connections plus Dow Jones, Source, Midas, Tymenet, CSIROnet and Telenet. It supports answer or originate mode; auto-answer, auto-disconnect; manual dial (with auto re-dial); and voice or data modes.

Further information: NetComm (Australia) Pty Ltd, 8/33 Ryde Rd, NSW, 2073. Tel: (02) 498 5577.

Telex system

OFFCOM has developed a new version of its TOS (telex operating system) designed to suit most MS-DOS/PC-DOS microcomputer systems. One of the main cost benefits is that messages can be held for transmission until off-peak hours. Other benefits include ease of preparation, use of mail codes, auto-dialling, repeat dialling, electronic filing, reduced telephone use, security and price justification.

Further information: Offcom Pty Ltd, 116 Alexander St, Crows Nest, NSW, 2065. Tel: (02) 438 4199.



Telex Operating System for MS/DOS micros.

200M Bank

THE Bank is a new random access device which stores mass information on a tape. It has been designed to transfer information to or from a Winchester hard disk drive. It has two cartridges, one capable of storing 100M-bytes of information, the other has 200M-bytes of storage. It is designed to plug into an Omnitel local area network, having a built-in Omnitel server, so it can store information that is important but seldom used. Medical records, scientific data, historical accounting records and legal documents can easily be stored. Any item of information on a 200M-byte cartridge can be found in an average of 10 seconds.

Further information: Horizon Computer Corp, 7-9 Merriwa St, Gordon, NSW 2072. Tel: (02) 498 6611.

Genographics 1000

COMPUTER Images has announced that the Genographics 1000 is available as an upgrade package for an XT with a high-quality color monitor. The upgrade package comprises an IBM-compatible graphics adaptor board plus a set of graphics software. The software is designed for use by office staff, and allows the user to generate images comprising text, charts and graphs. When the system includes the optical graphics tablet, free form art can also be produced.

Further information: Computer Images Pty Ltd, Unit 3, Madison Place, 385 Pacific Highway, Crows Nest, NSW, 2065. Tel: (02) 922 7044.

10-Net LAN

SOFTWARE Corp of Australia has announced the release of 10-Net local area network system, designed to work with SCA's database management system, 10-Base. By connecting PCs to 10-Base



programs, the 10-Net network system can create a LAN that allows users to share not only information but also hard disk devices and printers.

Further information: Software Corp of Australia Pty Ltd, 449 Swanston St, Melbourne 3000. Tel: (03) 347 7011.

Graphics printers

PERICOMP'S P Series graphics printers claim to have many features unavailable on any other printer in its price-performance range. These include Maisey Mode which produces correspondence-quality text approaching that of daisywheels, and data mode which allows computer printout at more than 200 char/sec. An option turns both the P Series machines into color graphics and text printers, with Dot Plot graphics for business and professional charts and graphs. The printers produce output for small business systems and professional workstations, and are modular in design to facilitate upgrades. Color printing is software controlled with a choice of primary and process hues in ribbon cartridges. RS232 and Centronics interfaces are standard, allowing connection to any popular business computer, and a range of typestyles are available. The Pericomp P-80 and P-132 printers come complete with an automatic sheet feeder and are available for \$3500 including sales tax.

Further information: Pericomp Computers and Peripherals, 345 Wickham Tce, Brisbane, Qld 4000. Tel: (07) 229 9200.

Popcom modems

PRENTICE Corp of California, has introduced the newest member of its family of Popcom personal communications modem products, the Model C100. The C100 is a modem card product for the PC, XT, Portable and IBM slot-compatible machines. The design is based on features provided by a proprietary custom CMOS design developed by Prentice. This design is also in Prentice's recently released standalone personal computer modem, the Popcom X100. The C100 is a 300 bits/sec and 1200 bits/sec, full duplex, auto-dialling modem card with a full range of intelligent features that are compatible with most popular communications software. The suggested retail price is \$US445.

Further information: Prentice Corp, 66 Caspian Dr, Sunnyvale, California, USA.

Four enhancements

SOFTWARE Connections has announced four enhancements to LAN: Datastore, its relational database management system designed specifically for local networks. The features allow LAN: Datastore users to merge information from up to 15 databases; change record formats, fields, keys and other parameters of existing databases without rekeying information; perform summary calculations on data; and output the data in six different ASCII formats or in DIF file format. A new relational join feature (allowing information to be merged from up to 15 databases) can now be executed through a menu interface. LAN: Datastore users can change the definition of a database without retying existing records. Summary calculations can be performed on all databases; these calculations include counts, totals, averages, and the minimum and maximum number in a database. The ASCII and DIF file feature allows LAN: Datastore users to input their data from or output it to Lotus 1-2-3, WordStar, dBase II and other spreadsheets, mail list, word processing, and database management software packages.

Further information: Ampec Electronics Pty Ltd, 114 Terry St, Rozelle, NSW 2039. Tel: (02) 818 1166.

SOFTWARE

EtherSeries

IMAGINEERING has released the EtherSeries, a family of hardware and software networking products for the PC. EtherSeries networks provide peripheral sharing, information access and personal communications. EtherLink, a user installable plug-in board, connects a PC to Ethernet. Users can then use EtherShare, EtherPrint and EtherMail.

Further information:

Imagineering, 579 Harris St, Ultimo, NSW 2007. Tel: (02) 212 1411.

Friday filing

DATA General Australia has added Friday! and dBase II to the list of MS-DOS and CP/M-86 software now available for its Desktop Generation computer. Eighteen new vertical applications are now available from Evolution 1, Elcomp Systems, Transaction Data Systems, Tremco and Keymark systems to run under Data General's own R-DOS operating system. These are multi-user software packages for general accounting, purchasing and management for real estate, law, medicine, construction, membership associations and pharmaceuticals. dBase II is a relational database utility, while Friday! is an integrated electronic file management system.

Further information: Data General Australia Pty Ltd, 30-32 Ellingworth Pde, Box Hill, Vic 3128. Tel: (03) 895 8311.

Client Accountant

ACCOUNT Soft has released The Client Accountant, a package for accountants. The software runs on PCs and compatibles, and the PC-DOS operating system can handle three printers. Client Accountant maintains a master file of all clients. Users can have several different coded account chart structures for different purposes. Each client or "job" has its own data file, and this data file "knows" which chart structure it belongs to. It also "knows" which report formats belong to it.

Further information: Account Soft Pty Ltd, 48 Dreuermann St, Bairnsdale, Vic 3875. Tel: (051) 52 6111.

MultiMate word

AN 83,000 word Australian/British dictionary has now been added to SCA's latest version of the MultiMate word processor. Version 3.21 of MultiMate, now being shipped to dealers, contains other improvements which include support for more than 50 printers including Epson, Nec, Toshiba P1350, Daisywheel, Diablo and Brother, and makes even more extensive use of the sophisticated facilities offered by many printers. MultiMate transforms most IBM plug-compatible personal computers into dedicated word processing machines. Designed to emulate the Wang word processor, MultiMate performs more than 100 word processing functions, almost all being accessible by one or two keystrokes. MultiMatejr has recently been released for the PCjr.

Further information: Software Corp of Australia Pty Ltd, 449 Swanston St, Melbourne 3000. Tel: (03) 347 7011.

PC calculator

SOFTPACK has announced a new package called CALCPack which converts a PC into a personal calculator. CALCPack displays the "buttons" of the calculator on the screen and you can use your keyboard as if you were using a pocket calculator. CALCPack is available for the PC and HP 150 with PC compatible versions due for release soon. Features include Trigonometrical functions (rad/deg), per cent, pi, factorial, 10 memory registers, day calculations and day-date-time display.

Further information: Softpack, 5 Cutler Ave, Moorooka, Qld. 4105. Tel: (03) 277 1323.

Smart Link

SI PRODUCTS, the Australian subsidiary of Software International, has announced a financial applications micro-to-mainframe link designed for the PC. The package, called Smart Link, was released in May. Smart Link can be installed in as little as 15 minutes. It works with many popular spreadsheets, including Lotus 1-2-3, VisiCalc and Multiplan.

Further information: SI Products (A/Asia) Pty Ltd, 55 Lavender St, Milsons Point, 2061. Tel: (02) 92 0811.

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People packages

OLYMPIA has added six business and professional packages to the range of software available for its People microcomputer. The packages are Business Manager from The Software Works, an insurance package called Broker and a comprehensive real estate package called Property Management System from ARM Computer Solutions. Measurement Control Systems, designed by Manfred Sauter, is also available on People for use in control and monitoring of up to 200 industrial devices. BHL has provided the BHL legal package and Cerebral Systems has provided Genesis, a medical package.

Further information:
Olympia (Aust) Pty Ltd,
59-61 Dickson Ave, Artarmon,
NSW 2064. Tel: (02) 439 3444.

Attache deal

SPERRY Corp is to market Attache software with the Sperry PC it plans to release in Australia in August. **Further information:** Sperry Corp, 100 Miller St, Nth Sydney, NSW 2060. Tel: (02) 929 7800.

Enhanced Multiplan

MS-DOS Multiplan Version 1.2 is now available in Australia. It offers three major enhancements over Multiplan 1.10. The first is expanded financial functions, specifically the modified rate of return (MIRR), which allows users to explicitly specify the reinvestment rate of interim cash flows of an investment. Multiplan can now be run in color on the PC and PCjr. There is a choice of 16 colors for each window. Color is selected via the Window Paint command. For version 1.06 users can update for \$50, while those with Multiplan 1.10 can update for \$25. The retail price of Multiplan 1.2 is \$395. Microsoft has also released the latest version of Fortran which includes floating-point, MS-DOS 2.0 file and overlay linking options. Another enhancement is support for arrays of more than 64K bytes.

Further information:
Microsoft Pty Ltd, PO Box 98,
Terrey Hills, NSW 2084.
Tel: (02) 450 2522.

Wordcraft release

PERSONAL Computer Services has announced the release of a new version of the Wordcraft word processing package from Dataview Ltd (UK), for the PC/XT, running under PC-DOS. As well as database, spelling checker, text communications and direct mailing capability, the new system now includes a full function calculator to perform a full range of calculations on figures held in text as well as automatic row and column arithmetic. The system can also read and edit files from other programs such as WordStar, MailMerge and Multiplan.

Further information: Personal Computer Services, 26 Ridge St, Nth Sydney, 2060. Tel: (02) 92 6783.

Select Write

SELECT Information Systems has released the Select Write word processor for the PC in Australia. Select Write is menu-driven, supports boilerplates (sections of text you can store and insert into several documents), lets users view one document while editing another and provides search-and-replace abilities. Programmers can use Select Write as a full-screen editor for writing programs. MS-DOS versions of Select: The Word Processor for the TI Professional and the Victor 9000 have also been released. The 3.0 version features cursor memory, key files, punctuation positioning, and includes an expandable spelling checker and a mailing list merge function. Suggested retail price is \$650. An MS-DOS update package is also available for the Victor 9000. Suggested retail price is \$175.

Further information:
The Software House,
80 Mount St, Heidelberg, Vic. 3084.
Tel: (03) 459 7877.

Software database

SOFTWARE Corp of Australia has launched a database management system called 10-Base. The system is based on the SQL (sequel) relational DBMS language, originally developed by IBM for mainframes. 10-Base can exchange information with Lotus 1-2-3, MultiMate, WordStar and other popular microcomputer software.

Further information: Software Corp of Australia Pty Ltd,
449 Swanston St, Melbourne 3000.
Tel: (03) 347 7011.



The Atom II travel agency package in action.

Automated travel

UNITED Permanent Travel Services has chosen Atom II (Automated Travel Office Manager) software. The package was developed by Cosmic Systems Inc and is marketed through The Travel Software Co Pty Ltd to distributors around Australia. The suite comprises nearly 100 programs taking up more than 900K bytes of compiled code. Atom II was developed over three years by programmers and analysts working within the travel industry and runs under CP/M, MS-DOS and TurboDOS operating systems. Most current installations are on Wang PCs and NEC APCs.

Further information: The Travel Software Co, 199 Albion St, Surry Hills, 2010. Tel: (02) 331 5390.

16-bit Mirage

DIMENSION Graphics has announced the Mirage distributed business graphics package for the PC, Convergent Technologies and 16-bit personal computers with MS-DOS. Mirage is also available on Prime, Vax, ICL and other mainframes, making it one of the few packages available both on large multi-user systems and single-user PCs. Interaction with the program is via menus, command files or cue charts. Display formats are stored externally and include line, bar, pie, 3D bars, Gantt charts, free-format text and drawings and maps. New formats may be defined by the user and included without altering the program. Menus take one single numeric key stroke. Operating Mirage via menus, therefore, resembles dialling phone numbers.

In command code, English-like commands are typed in or read from files. Users may define new menu-structures or new commands without altering the program.

Further information: Dimension Graphics Pty Ltd, 265 Miller St, Nth Sydney, 2060. Tel: (02) 929 5794.

Keyboard enhancer

SMARTKEY II, a new release of the keyboard enhancer program has been announced by FBN Software. SmartKey is an operating system extension which remains in memory while other software is running. The program allows any of the keys to be redefined to produce a character string of any length with a single keystroke. SmartKey II is compatible with programs such as WordStar, dBase II, Perfect Writer, Multiplan and Lotus 1-2-3. The package is available in both 8- and 16-bit versions for machines running CP/M, MS-DOS, PC-DOS or CP/M-86 and costs \$69 plus tax.

Further information: FBN Software, 16 Coles Place, Torrens, ACT 2067. Tel: (062) 86 1102.

PC Baby

STRATEGIC Information Systems has announced Baby/34, a system that allows the PC and XT to emulate the System 34. It allows the PC to develop or run existing RPGII while using standard PC-DOS features.

Further information: Strategic Information Systems, 150 Albert Rd, St Kilda, 3205. Tel: (03) 690 3499.



Colleen Pask of Computaventure Weekends.

Goin' up Country

COMPUTAVENTURE is organising weekends in the country for people to understand and operate personal computers, and at the same time enjoy the countryside and the facilities and cuisine of some of the best country hotels and guest houses in NSW. Each weekend will be limited to 24 participants using 12 Sperry PCs with qualified instructors. The course begins at 9pm on Friday with an introductory talk and an entertaining demonstration of the power of the personal computer. There will be wine and cheese and an opportunity to get to know the people on the course. Saturday's program covers concepts, terminology environments (disk operating systems and programming) plus a discussion and demonstration of application packages. Topics covered on Sunday will be interfacing with mainframes, office automation and selection of a personal computer. Cost of the weekend is \$250 a person based on shared accommodation. This includes accommodation, meals, instruction and plenty of opportunity for getting "hands on" experience.

Further information:
Computaventure, PO Box 303, St Leonards, NSW 2065.
Tel: (02) 908 2174.

Pick a board

PICK Systems has added two new directors to its board. They are veteran computer executive, industry analyst, and publisher, Gerard Guyod and Lt. Gen. Eugene Tighe Jr, former head of the Defence Intelligence Agency, chairman of the board of Satellite Technology Management Co, and president of Eugene F. Tighe Jr Inc, an international consulting organisation.

Yankee seminar

THE Yankee Group will hold its second seminar for the year on August 1 and 2. Called The IBM Impact, it will be at Sydney's Hyatt Kingsgate Hotel. The seminar will examine all aspects of IBM's product range and marketing strategy. Visiting Australia for the seminar will be senior Yankee Group researchers Frank Gens and Dale Kutnick. Gens specialises in research into IBM, and Kutnick has a wide knowledge of all aspects of the computer industry, particularly of IBM. Local speakers will round out their observations with comments about IBM in Australia.

Further information:
The Yankee Group,
158 Avoca St, Randwick, NSW 2031.
Tel: (02) 399 8200.

Sanyo chip

UNDER a recent agreement with Intel, Sanyo Japan has gained the rights to manufacture its own 8088 processors. Intel has agreed to license Sanyo because of the enormous production demands caused by Sanyo's MBC 550 series PCs.

Further information: Sanyo Office Machines, 127 Walker St, Nth Sydney, 2060. Tel: (02) 929 4644.

Eagle dealership

ASIA/Pacific Technology Marketing has announced the appointment of BS Microcomp Pty Ltd of Melbourne, as an authorised Eagle computer dealer. BS Microcomp will initially market the Eagle Spirit. BS Microcomp chose the Eagle Spirit after evaluating several PC-compatible products.

Further information:
Asia/Pacific Technology Marketing Pty Ltd,
200 Pacific Highway, Crows Nest,
NSW 2065. Tel: (02) 929 7699.

Sharp venture

TCG Group has joined with Sharp Corp of Australia to market Sharp's PC5000 portable computer, the Squirrel. The companies have signed an agreement in which TCG will market the PC5000 in its traditional source data capture vertical markets, while Sharp will continue its current marketing activities through its dealer network. The PC5000 incorporates 16-bit capabilities, an optional built-in printer and magnetic bubble memory on cartridge which eliminates the need to transport bulky disk drives. It is battery powered, allowing use in remote locations.

Further information:
TCG Group, 30 Balfour St,
Chippendale, NSW 2008.
Tel: (02) 699 8300.

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NEXT MONTH



LOTUS LAUNCHES SYMPHONY

Lotus Corporation launched its integrated applications program Symphony at the beginning of July. The program, expected to be the fastest selling ever, will be released in Australia on July 26, Ron Pollak gives his impressions of a pre-release version of the product.



LOW COST PCs

Two Australian companies are distributing computers that provide an opportunity to use a powerful PC system at relatively low cost. Neville Angove reviews Sanyo's (not so compatible) MBC-555 and Ian Robinson reviews Dick Smith's (very compatible) Challenger.



CONCURRENT CP/M-86

Digital Research's Concurrent CP/M-86 operating system has been available for some time but has yet to establish itself in the Australian market. Peter Harris details his involvement with Concurrent CP/M-86 with the Windows extension as it has developed from Beta test to the final release version over the past year.



WORD PERFECT

William Hall, one of Australia's better known word processor reviewers, has spent five years searching for a good word processor. He thinks he has finally found what he has been looking for with Word Perfect on the PC.

Australian PC World welcomes contributions from PC users. We are particularly interested in applications, PC-to-mainframe linkages and users' experience with popular software packages. Contributions should be submitted double spaced to: Australian PC World, Computerworld Pty Ltd, 37 Alexander Street, Crows Nest, NSW 2065. Tel: (02) 439 5133.

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